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CONTENTS

DEPARTMENTS

MARKET REVIEWS

STATISTICS

ARTICLES

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Pellet Rubber

Andrew Hale[1]

THIS is the first of a series of three articles which deal with the preparation and processing of rubber prior to fabrication and which discuss the more recent and even projected developments that give promise of minimum handling labor, maximum continuity of flow, and highest quality and uniformity of product. The second article will consider modern methods of weighing the ingredients in rubber batches. The third and concluding article will present a flow chart and explanation of the methods contemplated in the "Mill Room of the Future." ***Editor's Note.***

WE LOOK down from the cat-walk into the "Mill Room of the Future." Rubber is actually flowing! Pellets pour from a plasticator, and in a stream they go through water sprays, are air dried, and then enter a blending storage. From here they go into and emerge from scales and continue their course to Banbury mixers. In an incredibly short time new pellets are created, but now they pour from a plasticator-pelletizer as mixed stock, are cooled, and then stored in overhead blending bins. Finally, they trickle forth in a controlled stream and, like sand through an hour glass, feed a warm-up mill for calender or tuber.

In the conventional plant of today the accepted unit is a sheet or slab, which refuses to roll or flow. Every time it is hung on a conveyer or piled on a skid, as much labor is required to remove it. In a modern tire mill room, rubber is manhandled as much as eleven times between breakdown and the warming mill. Everywhere we see it piled high on skids occupying a generous portion of valuable mill room space. Is it any wonder that one of America's foremost industrialists expressed his amazement over existing mill room handling methods?

Pellet rubber opens the door to a brand new mill room. Rubber no longer defies automatic transportation, weighing, and mixing.

[1] Manager, Akron office, Farrel-Birmingham Co., Inc.

What Is Pellet Rubber?

To obtain free-flowing rubber instead of sheets, strips, or even thick slices, the mass must be converted into rolling pebbles. The pellet in commercial use today is one-half to three-quarters of an inch in diameter and usually varies from one-half to one inch in length, but occasionally is one and one-half inches long. It is cylindrical with rounded ends, which is as close to a sphere as is commercially possible to produce. See Figure 1. For free-flowing conditions a maximum size must be observed. When pouring pellets into a scale hopper, it is imperative that the flow be stopped when the scale hand indicates correct weight. Oversize pieces would give excess weights. For instance, it would be quite impossible to obtain exact weights with large chunks of coal.

Automatic scales capable of being set from a remote control board are already in regular use in industries handling free-flowing materials. Therefore certain definite conditions compel reduction to a specific size. Why

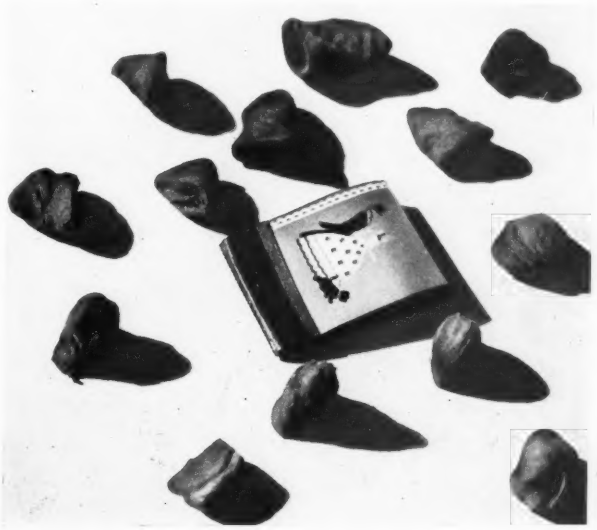


Fig. 1. Rubber Pellets

not go further? Why not reduce the size to that of a pea or even a sugar granule?

Inasmuch as the pellet just specified multiplies the exposed surface per given weight in slabs by a hundredfold, a reduction in cooling time is obtained. Actual reduction in mixing time is also realized. But there also exists a definite minimum. Rubber surfaces are tacky before vulcanization and must be thoroughly covered with dusting powder to prevent adhesion. If pellets were reduced to pea size, the amount of dust necessary to prevent adhesion would become prohibitive. It is possible to use one of the batch ingredients as a dusting agent, but the amount permanently remaining with the rubber cannot be relied upon to be constant. To date, soapstone or talc has been used for dusting, and the amount adhering to the rubber averages considerably less than one-half of 1% on the rubber weight. Chemists generally agree that this amount does not prove to be an adulterant.

Development of Pelletizing Equipment

Original experiments produced individual pellets of rubber directly from the bale, in a smaller size than at present. It was found possible to coat thoroughly all surfaces of each pellet with soapstone so that the pellets did not adhere to one another. The results of these experiments demonstrated that the proper method of attack was being followed and encouraged continuation of the work which had been undertaken.

The industry had already invested in Gordon plasticators; so why not employ the principles of these machines to produce pellets? The twenty-inch size machine can take entire bales, but its output is increased considerably if the bales are cut and heat-soaked prior to feeding. In the instance of frozen rubber, cutting of the bales exposes greater areas and, therefore, insures "thawed out" rubber in a shorter time. Frozen rubber induces immense strains on milling equipment, and it is quite evident that preheated rubber not only adds to the plasticity, but pays for itself through contributing increased output from the plasticator.

A three-inch laboratory-size plasticator was then built which resembled its elders in every way, with the exception of the discharge end. The stationary head which surrounds the rotating head was perforated. Knives were mounted in a hub, and the latter was mounted on an extension of the rotating head. Rubber was therefore compelled to extrude through the many small holes and was then severed by the revolving knives.

Experiments were then conducted with various other methods of keeping the pellets separated so that they would flow freely. Realizing the advantages of water, an enclosure was built around the knife cage with a spillway located at the top. Water and then wet mixtures of soapstone and clay as well as various types of neutral soaps were tried. None of these proved as successful as the dry mixtures which had been used in the first experiments. The enclosure was inverted with the discharge at the bottom, and dry soapstone was blown into the enclosure so that the pellets were thoroughly coated with soapstone before they had an opportunity to adhere to one another.

During this time the correct size for the pellet was determined. Sufficient quantities were manufactured to provide complete batches for a size 11 Banbury mixer, and their action was closely watched in the Banbury chamber. The belief that mixing times could be greatly reduced was then confirmed. Carbon black and rubber pellets were fed into the mixer almost simultaneously, and it was noted that the two materials combined almost immediately. No power readings have been taken, but it is believed that, with gradual filling or loading, extreme peaks will be moderated.

Inasmuch as these pellets would roll and flow easily, it was evident that they were sufficiently small and of correct shape. It has been pointed out that pellets could be too small because of the amount of insulating dust they would carry. The sizes were adjusted upward until the dust percentage became negligible and beyond the criticism of the exacting chemist. The increase in pellet size was beneficial in mixing and particularly in mixers where rotors had become worn considerably.

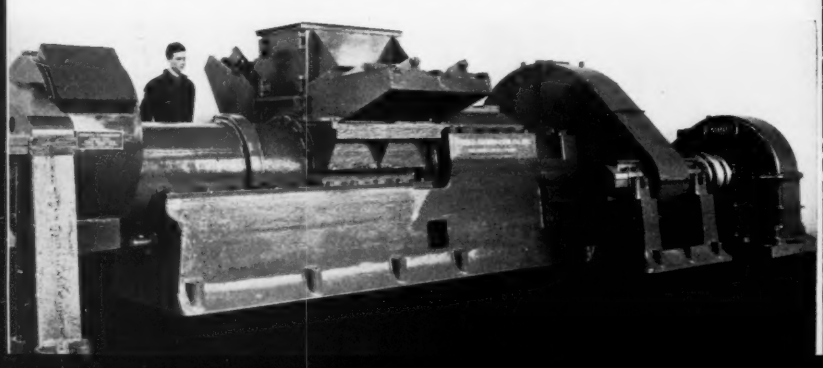
The Ford Motor Co. had watched these experiments with great interest. The small plasticator was put into laboratory production at Dearborn, and satisfactory pellets were produced at the rate of 180 pounds per hour for a considerable time. This led to the building of one and then two similar heads for their twenty-inch machines. A trial run encouraged the modification of these heads to obtain better plasticity than had been possible in the old way. The final result was a head which reduced all operations to but a single pass through the plasticator. In other words, no rubber will return for a second pass, and at this writing preparations are being made to convert both machines into pelletizers and to automatically cool, convey, and weigh directly into the Banbury.

During experiments at Ford, the Goodyear Tire & Rubber Co. became interested, but its problem was a different one, because size 27 Banbury mixers were already employed to break down rubber. Both concerns had estimated the handling costs throughout their mill rooms and appreciated fully the economy derived from the fundamental law of "continuous and automatic work flow."

"We want an enormous tuber with a pelletizing head on the end," said Goodyear engineers. This would then take the place of an 84-inch mill sheeter below the Banbury. In October, 1940, this huge machine (see Figure 2) was put into regular production, together with well-designed

Fig. 3. Rubber Discharging from Banbury into Pelletizer

Fig. 2. Hale Pelletizer Which Receives 750-Pound Batch of Broken Down Rubber from Size 27 Banbury and Discharges the Rubber in the Form of Pellets



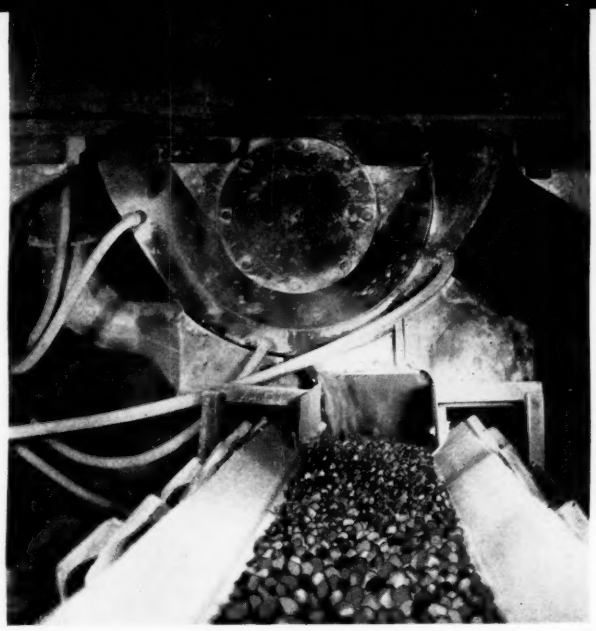


Fig. 4. Pellets Discharging from Pelletizer

handling equipment, and it has been in continuous operation since that time.

Figure 3 illustrates rubber descending from the Goodyear size 27 Banbury into the tuber-pelletizer. In Figure 4, which is a view opposite the discharge end of the pellet head, the pellets are shown as they are being carried away from the pelletizer. Rubber hose, which can be seen at various points on the dusting chamber, carry the mixture of air and dry soapstone, which insures non-adhesive pellets. The excess soapstone is removed through suction hoods mounted directly below the discharge opening.

A new idea has been developed which, although simple, is destined to cause radical changes in future operation.

Pellet Cooling and Conveying

It is conservatively estimated that crude rubber pellets can be reduced from 300° F. to room temperature in less than ten minutes. The well-known method of spraying, air cooling, and drying is used. The equipment now employed includes a wide cradled belt having deflectors at certain intervals. These deflectors are arranged at an angle across the belt and act as bank boards. When a batch of pellets engages one of these boards, the board swings through a short arc and, in doing so, opens the water spray valve so that water flows only when there is a bank of pellets to be sprayed, thus insuring a dryer belt. Furthermore the board is located a slight distance above the belt to allow only a thin layer of pellets to pass beneath. Surplus pellets tumble and roll across the belt and escape through an opening provided at the end of the board. This tumbling action makes possible the full surface wetting of each pellet. See Figure 5.

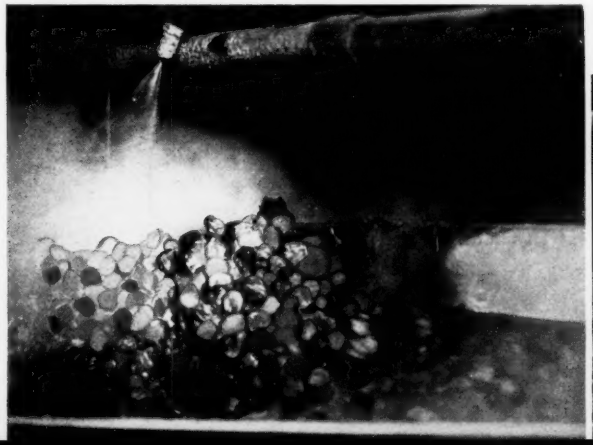
Farther along the belt the above process is repeated; the deflection is toward the opposite side. See Figure 6. In this manner every pellet is thoroughly wetted, but excess water is completely evaporated. Then they discharge into a rotary drier and are in condition for transfer to storage.

Serious thought has been given to vibrating screens which, if pitched at six or eight degrees, would permit the pellets to tumble and move forward simultaneously. These screens could be used in place of belts for at least the initial cooling where water spraying and evaporation take place. In an article on "Mill Room of the Future" (to be published at a later date), these screen trays are shown, one above the other, under which arrangement it is the aim to complete the cooling operation in one descent.

Air cooling can be accomplished on a long belt where circumstances require considerable horizontal travel. The bank boards described above could be located at various intervals, and the churning pellets could be exposed to an air blast.

Material handling engineers will relish the task of applying many well-known conveyers now used in transportation of coal and grain. Their choice extends over belt, bucket, pneumatic, and many other types.

Fig. 5. Pellets Entering First Set of Sprays

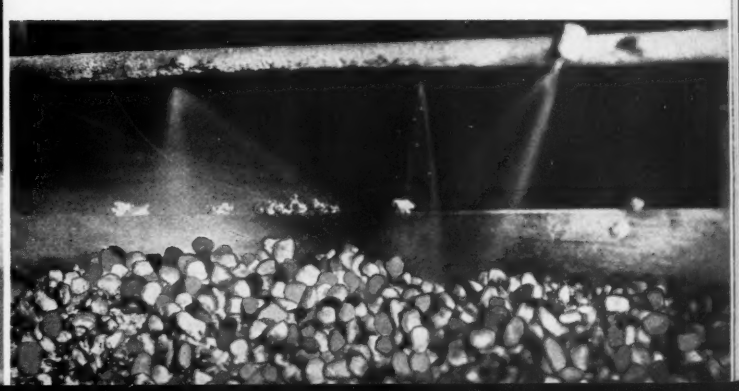


Storage

Crude rubber pellets in normal storage conditions weigh approximately 40 pounds per cubic foot. In early experiments hot pellets were packed in drums and stored for a period of two weeks in order to determine the results which might be expected in large bins at mid-summer temperatures. It would be a catastrophe if these pellets cemented themselves together. There is no adherence, however, because the surface of every pellet is thoroughly coated with soapstone. What actually does occur is a settling and tendency to interlock. If pellets could be used fairly fresh, or within a few hours, this interlocking would not occur. It is therefore desirable to provide some means of mechanical agitation. When the pellets, which had been stored hot, were removed from their drums where they had slowly cooled, a surprisingly small force was required to separate them completely.

Figure 7 shows a shortage bin now almost completed. The walls are flared outward toward the bottom to avoid any possible "bridging" of the material. The contents rest on a series of shafts from which teeth or spikes extend. These spikes clear each other, but not at a sufficient distance to allow individual pellets to leak through when shafts are stationary. On the other hand, when the spikes rotate, they dig into the bottom of the pile, and pellets rain down on to the feed belt below, insuring free-flowing pellets for weighing purposes. The spiked

Fig. 6. Pellets Entering Second Set of Sprays



shafts are connected with a link chain driven by the belt pulley below, and they rotate only when rubber pellets are required.

Blending

The necessity for agitation is a blessing in disguise. It will be noted that pellets are simultaneously picked out of many different zones. These zones are already mixtures of several rubber bales, but here this blend is multiplied many times.

In the plant of the future another type of bin, shaped like a truncated cone is shown. Pellets arrive by means of a pneumatic conveyer and collector and then drop through the smaller area at the top. This bin has a vertical center shaft with extending spokes that support a spiral or helicoid screw. The pitch of this screw is gentle and it is not very wide. This idea is borrowed from cement mixers. By slowly rotating this spiral, the pellets are lifted along the sides of the bin, and are replaced by pellets working down from the top and around the center shaft.

In this type of bin the blending spiral is in continuous motion just as is the case in many oil storage tanks. However the blending is complete and can be expanded to the intimate mixing of thousands of pounds.

We often hear of tires giving extreme mileage, but occasionally there are tires, made of the same stock and in the same mold, which embarrass the manufacturer. Many thousands of dollars have been spent on control equipment. The personnel of modern factories watch temperatures with a critical eye during the various operations. Automatic temperature controls have been installed on mixers, calenders, and vulcanizers. Expert supervision with thermocouples in tread tuber heads is part of the vast program to attain uniformity in the quality of the product.

But what about rubber itself? Certainly, wide qualitative variability is inherent in natural rubber. Blending of rubber to date is but a gesture toward what is actually required to insure uniformity.

In the plant of the future plasticized crude rubber, master batches, and the final mixed stock will all be pelletized. Consider, then, the above-described bins as temporary resting places for rubber pellets in these three stages. It is our firm prediction that a uniformity beyond the most optimistic hopes will eventually be attained.

Compounding

It is a simple matter to weigh liquids through control of their flow. It has already been demonstrated that pellets have free-flowing properties so that the carving knife and platform scales are obliged to give way easier and more accurate methods. In the Ford tire plant the pellets will be automatically weighed and discharged on a belt feed to the Banbury hopper.

A number of today's compound rooms consist of a series of pigment bins under which travels a scale car. The man riding this car stops at the various bins, opens the chute, and gradually throttles the pigment flow until the required amount has passed into the pan. Bins with rubber pellets can be added to this line so that the same man can weigh out all ingredients and charge them into the mixer. In addition there can be bins for master batch and even reclaim rubber pellets.

Compound rooms are being revolutionized. Only a few years ago pigments were stored in barrels or bags. Men with scoop shovels retraced their steps many times

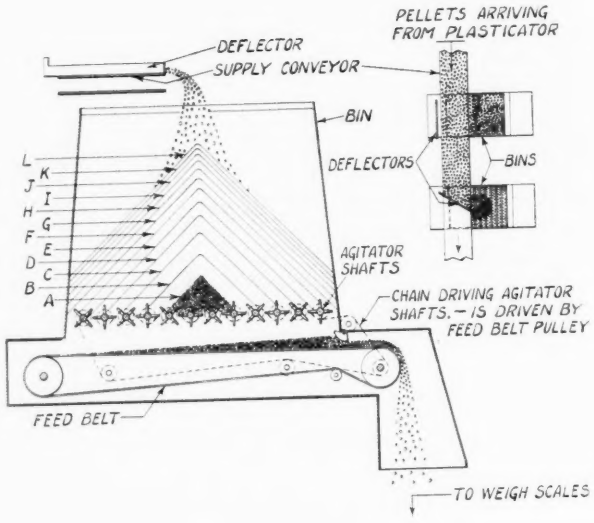


Fig. 7. Pellet Storage Bin with Agitators and Feed Belt to Scales

to distant scales before a batch was completely formulated. We have but to finish the job and put everything in bins. This is the last step toward "good housekeeping", which always results in economy and guaranteed accuracy.

Finally, the floor space will be released for expansion of productive equipment, or, in event of a new plant, the lower building costs will more than offset the initial cost of overhead bins.

Mixing

Shorter mixing cycles, which have been mentioned previously, are quite obvious when it is considered that the "specific" area of the rubber has been multiplied hundreds of times. Someone once remarked that if rubber could be sheeted out extremely thin and a layer of black be applied over its entire surface, then one need but roll this together and pass it through a mill to obtain complete dispersion. This is an ideal illustration of how mixing can be assisted by increasing the "specific" area.

If you have never seen rubber pellets flowing into a Banbury hopper, a real sight is in store for you. The last handicap to automatic cycle control for Banbury mixers has been removed because all the rubber finds its way into the chamber. There will be no pinching between floating weight and hopper throat and, therefore, there will be no necessity for raising and lowering the weight several times to make sure the complete charge is incorporated in the mix.

Conclusion

This article has been confined to what has been or is being accomplished with pellet rubber. A later article will predict further possibilities wherein finished stock from Banbury mixers will be likewise pelletized, automatically cooled, and stored in bins over warming mills.

Fortunately pelletizing heads can be applied to existing plasticators and strainers. They can be built in sizes to suit various production requirements. Therefore the advantages herewith outlined are available not only to the large, but also to small producers.

Plasticization of Rubber[1]

Arthur M. Neal[2]

THE importance of the vulcanization of rubber has been so well publicized that practically every layman, as well as all rubber technologists, realize that Goodyear's discovery transformed a laboratory curiosity into an important article of commerce. On the other hand very few people, even including rubber technologists, have stopped to realize that if it were not for the fact that rubber can be plasticized, even Goodyear's fundamental discovery of vulcanization would have had very little influence on the development of the rubber industry as it is known today. If rubber could not be plasticized, it would be almost impossible to use crude rubber for any purpose, and the industry would be restricted to those developments which employ latex.

In view of the importance of this softening action, we may well stop and ask its definition and how it influences the utilization of rubber. Webster defines plasticity as "the ability to retain a shape attained by pressure deformation" and a plastic substance as one "capable of being molded." Plasticization, or the development of plastic properties in rubber, is thus seen to be that phenomenon which permits us to carry out our normal operations of molding, extruding, shaping, etc. Since rubber is a complex material which has both plastic and elastic properties, the relations between the force applied and the deformation produced are much more complicated than is the case with a substance such as lead, which is almost completely devoid of elastic properties.

Measurement of Plasticity

It is obvious that no satisfactory progress can be made in the study of any phenomenon until an apparatus or test is devised which will enable the investigators to measure quantitatively those changes which are taking place. It is somewhat surprising, therefore, to realize that this problem of plasticization which has caused the rubber technologists so much difficulty in the factory has only been the subject of quantitative analysis for a comparatively short time. The first description of an apparatus designed to follow the development of plasticity in rubber was given by Williams at a meeting of the Rubber Division of the American Chemical Society in September, 1923, and published in *Industrial and Engineering Chemistry* in April, 1924. This parallel plate plastometer of Williams has been modified by several later investigators, notably by Van Rossem and De Vries and later by Karrer. Extrusion-type plastometers have also been developed first by Marzetti, later modified by Griffiths, and more recently by Dillon and Johnson. A third type of plastometer is the shearing disk type developed by Mooney. A fourth type is the pendulum plastometer developed by Williams. Without analyzing the relative merits of these various plastometers, it is sufficient to state that they are all instruments for quantitatively following the phenomenon of the development of plasticity.

We cannot dismiss the subject of plastometers without emphasizing one factor which has frequently been forgotten in applying the measurements obtained by the various instruments. This factor is temperature control. Fundamentally, all quantitative measurements of plasticity depend upon the maintenance of iso-thermal conditions. In other words, temperature control is important, and both the rubber stock and the apparatus must be at a uniform temperature during the course of the test. Fortunately for its use as an insulating material, but unfortunately with respect to the measurement of plasticity, the transfer of heat through rubber is slow, and a definite and relatively long time is required to allow the test specimens to reach a uniform temperature. This factor is important in all measurements of plasticity which are to be used as the basis of research and development as differentiated from those measurements which are concerned only with control. If the plasticity measurements are being used solely for the purpose of factory control and successive batches of the same stock are being treated in approximately the same way, some of the more rapid methods of measurements which neglect the time required for attaining a constant temperature are perfectly suitable.

Factors Influencing Plasticization

The fact that rubber can be plasticized and made workable through mechanical mixing was first demonstrated by Hancock, and as a result of this investigation, he devised the first successful rubber mill. Since his discovery many advances have been made in machine design tending to produce mills and masticators of greater mechanical efficiency and greater capacity. Until the development of the first plastometer, however, much of the work done on the plasticization of rubber by milling was extremely inefficient. For example, it is so well recognized today that rubber is softened much more rapidly by milling on a cold mill than it is by milling on a hot mill that it is very difficult to realize that prior to the development of the first instruments for quantitatively determining plasticity this fact was understood only by an occasional "old-time" mill man and was not generally recognized by the trained technologists.

Lubricating Softeners

When mechanical action failed to produce the desired plasticity in any given rubber stock, oils, resins, and other softening materials were added and sometimes used in very considerable amounts. A general idea of the importance of these classes of compounds is apparent from a cursory examination of the patent literature which reveals over 50 different patents covering many classes of materials as softening agents for use in rubber. These so-called softeners, which are added to rubber primarily to aid in the plasticization and to increase the workability of the rubber stock, act in most cases in much the same way that grease and oil act on a "bearing" surface. They are lubricants which function by cutting down the internal frictional force within the rubber molecules or micelles. While these materials are satisfactory in fulfilling their primary duty of making the stock more plastic and more workable, they do suffer from one very serious drawback. In almost every case they survive vulcanization without change and are present in the final vulcanized product in a condition which tends to detract from

[1] Presented before the joint meeting of the Buffalo Group of the Division of Rubber Chemistry, A.C.S., and the Ontario Rubber Section, Canadian Chemical Association, held May 1, 1941, at Niagara Falls, Ontario, Canada.

[2] Head, Rubber Division, Jackson Laboratory, E. I. du Pont de Nemours & Co., Wilmington, Del.

the utility of the product for many purposes. High amounts of softeners in a stock very definitely tend to reduce the abrasion resistance and resiliency and to increase the cold flow and compression set of the vulcanizates.

Heat

Comparatively recently another method of developing plasticity in a rubber stock has been proposed. This method rests upon the investigations of Grenquist who showed that heating at a temperature above 100° C., and particularly at 150° C., caused a marked increase in the plasticity of the rubber. While this method has attracted a slight amount of attention, it has never attained the importance of the older method of mastication largely due to excessive degradation. Its commercial utility has largely been limited to a preliminary treatment used in combination with the method of softening by mastication.

Oxygen

The development of catalytic softening agents was a direct result of the discovery of some of the fundamental factors which cause the plasticization of rubber, and it, therefore, appears important to mention briefly some of these discoveries before proceeding to a discussion of specific catalytic softening agents.

By far the most important of these investigations were those carried out by Cotton and Busse who, working independently, one in England and the other in the United States, supplied the absolute proof that oxygen is required for the softening of rubber by milling. They found by milling rubber in the presence of different gases or under reduced pressure that satisfactory softening resulted only when oxygen was present. The method by which oxygen increases the plasticity of rubber has not yet been adequately explained. Ordinary exposure of rubber to air is ineffective, and the amounts of oxygen chemically combined with the rubber are known to be extremely minute. It can be definitely stated, however, that two conditions must be fulfilled for rubber to be softened by milling. The first is that oxygen must be present, and the second is that this attack by oxygen must take place while the rubber is under dynamic strain. The influence of strain upon the attack by oxygen has also been noted in the case of vulcanized rubber where it has been shown that failure on flexing is associated with an attack by oxygen, which attack differs from that which takes place when vulcanized rubber is subjected to the action of oxygen in the absence of mechanical strain.

Chemical Plasticizing Agents

The conception of rubber as a colloidal system was also of considerable assistance in developing the newer methods of plasticizing rubber. In investigating this concept, Williams has demonstrated that if a compounded rubber cement accelerated with a small amount of piperidine pentamethylene dithiocarbamate is allowed to gel, this gel can be peptized to a thin cement by the addition of a further amount of this accelerator and that this cycle can be repeated several times before vulcanization has proceeded so far that the rubber can no longer be peptized. He further demonstrated that this action is not restricted to piperidine pentamethylene dithiocarbamate, but is a general property of all accelerators, and that, broadly speaking, any accelerator will peptize a gel which is produced by its use or the use of some less active accelerator. Having found, therefore, that a vulcanized rubber gel can be peptized presumably to produce a material with a lower degree of aggregation, and knowing that the plasticization of rubber involves chemical attack by oxygen, perhaps somewhat analogous to the chemical attack by sulphur during vulcanization, and with the further consideration that softened rubber undoubtedly exists in a lower degree of aggregation than the original unbroken-down sheets, it was not a difficult step to conceive that there should be materials which would catalyze the plasticization of rubber.

Since these chemical plasticizing agents may conveniently be thought of as fulfilling the same function in the mastication of rubber that accelerators do in its vulcanization, it is not surprising that we have been able to discover various classes of compounds which will function. Among the more important of these are the aromatic hydrazines, for example, phenyl hydrazine, the thio-acids, a typical example of which is thio-benzoic acid, certain of the nitroso compounds, for example, nitroso-beta-naphthol, and by far the most important class, the aromatic mercaptans of which beta-naphthyl mercaptan is a representative example. The first class mentioned, that is the hydrazines were found to function when they were milled into rubber, and the rubber containing them was stored at elevated temperatures (in the neighborhood of 70° C.) for approximately 24 hours. The other classes of compounds act in a different manner. With all of these other types the compounds function as catalysts during the milling period, and it is not necessary to store the rubber containing these chemical softening agents after milling in order to induce plasticity. In fact, generally they show no acceleration of plasticization by any heat treatment after the milling operation.

Three members of the class of aromatic mercaptans, beta-naphthyl mercaptan, xylyl-mercaptan, and alpha-naphthyl mercaptan have been offered commercially as "RPA" No. 2, "RPA" No. 3, and "RPA" No. 4. Since these materials act catalytically, and only small amounts of the active ingredients are required to bring about the desired softening action, the active ingredient is diluted with an inert material for practical convenience in weighing and handling. "RPA" No. 2 and "RPA" No. 3 are standardized at such concentrations that they have equal activity as softening agents. "RPA" No. 4, which is just emerging from the experimental stage, is being standardized at a concentration which makes it two and one-half times as strong as "RPA" No. 2 or "RPA" No. 3. We can confine our discussion of the chemical softening agents to the use of a single "RPA", since, as might be expected, in view of the fact that the active ingredient in each of these materials belongs to the same class of chemicals, they differ from each other only in their activity. The methods of using them and the results obtained are otherwise the same.

Results with Various Methods of Mastication

In considering the use of the "RPA's" it will be helpful to keep in mind the analogy between the chemical softening agents and accelerators of vulcanization. Thus, just as accelerators are used in conjunction with other ingredients necessary for producing the desired vulcanizates, so the "RPA's" are used in conjunction with the commonly employed mechanical apparatus for mastication. In using them the rubber technologist is not limited to any special type of masticator, since we find that they are very effective when used on an open mill, in a Banbury, or in a Gordon plasticator.

Most accelerators function best at temperatures of vulcanization which are different from those used in non-

accelerated stocks; so it is not surprising to find that different temperatures are needed for breaking down rubber in the presence of the "RPA's" than in their absence. It has already been noted that the breakdown of crude rubber in the absence of "RPA" is speeded up by low-temperture milling. However, when the "RPA's" are used, the reverse is true, and high temperatures are beneficial This is shown by the following tests in which 22-pound batches of smoked sheets were broken down on a 30-inch rubber mill. The results of this test are summarized in the following table.

TABLE 1

% "RPA" Added	Mill Roll Temperature ° F.	Maximum Rubber Temperature ° F.	Time of Milling Minutes	Williams Plasticity Inch
0.0	40	180	34	0.110
0.0	230	300	60	0.135
0.3	40	180	28	0.110
0.3	230	300	18	0.110

In these tests the "RPA" was added as soon as the rubber took to the mill, and in the case of these stocks the batch was *not* cut back and forth on the mill during the milling operation, but allowed to run on an open mill with a small rolling bank. In case of the stock containing no "RPA", the batch was cut back and forth on the mill continuously during the milling period in order to obtain maximum softening.

The most important fact brought out by this test is the increased milling capacity obtained through the use of "RPA" No. 2. The time cycle for attaining the plasticity of 0.110-inch was reduced 47%. Expressed in terms of capacity this means a potential capacity one and eight-tenths times as great as normal from the same equipment. It should also be pointed out that, owing to the fact that continual cutting back and forth of the rubber is not necessary with "RPA", this increased capacity is obtained with an accompanying decrease in labor requirements.

In view of the importance of temperature in speeding up softening in the presence of "RPA" No. 2, it is obvious that this agent is particularly useful when a Banbury mixer is used for mastication. When used in this method of softening, the "RPA" should be added as soon as possible, preferably between two portions of the charge of rubber, and no more cooling water should be used than is necessary to protect the bearings. The effectiveness of the "RPA's" can be demonstrated by either of two general methods. The first consists of selecting a definite concentration and showing the effect of milling time on the plasticity of the rubber; the second consists in selecting a definite mixing time and showing the effect of varying the amount of "RPA" added. The first method was followed in showing the effectiveness of "RPA" No. 2 on mill breakdown, and the second will be employed in describing the use of "RPA" No. 2 in Banbury mixing.

These tests were carried out in a No. 9 Banbury using 200 pounds of pale crepe rubber and operating on a 12.5-minute cycle divided into 10 minutes for mastication plus 2.5 minutes for loading and dumping. In this test the development of plasticity was followed by means of a Mooney plastometer instead of the Williams parallel plate plastometer used in the test on the mill. The control test in which no "RPA" No. 2 was used gave a Mooney value of 95. Under the same conditions the use of 0.05% of "RPA" No. 2 reduced this value to 88, 0.1% to 83, 0.2% to 73, and 0.3% to 67. It will thus be seen that "RPA" No. 2 is extremely effective when used in a Banbury. Even the first small addition gave a marked increase in the plasticity, and up to about 0.3% "RPA" No. 2 on the rubber additional amounts materially increased the breakdown. Our tests show that larger amounts of "RPA" No. 2, while giving a further increase, are probably uneconomical except for very special purposes, as shown by the fact that the use of 0.6% of "RPA" No. 2 in this Banbury test gave a Mooney plasticity figure of only 58 as compared with the 67 obtained with 0.3%.

The "RPA's" are likewise very effective when used in conjunction with a Gordon plasticator. In general, it has been found advantageous to use either "RPA" No. 3 or "RPA" No. 4 with this method since they are both liquids which can be added conveniently through a dropping funnel into the hopper as the rubber is being charged. In one factory it has been found that the addition of 0.04% of "RPA" No. 3 based on the rubber will produce as soft a rubber after one pass through the Gordon plasticator as was obtained in two passes in its absence. In this particular plant, therefore, the use of "RPA" in the Gordon plasticator resulted in a doubling of production capacity. In addition to the speeding up of production, it is also found that greater uniformity is obtained when an "RPA" is used. This uniformity results in a smoother production schedule since fewer batches require remilling.

A consideration of these tests on the use of "RPA's" in mill breakdown, in Banbury breakdown, and in the Gordon plasticator shows that these chemical softening agents are adaptable materials and their use is not restricted to any single method of application. Desired results can be obtained in conjunction with any of the common methods of mastication, and the rubber technologist is free to vary mixing times, amounts of "RPA" or temperatures of mastication in order to obtain his results.

Behavior in Storage

One question which naturally arises is, "What is the effect of storage on crude rubber which has been broken down in the presence of 'RPA'?" This is a question which is difficult to answer on the basis of laboratory tests, but can be answered on the basis of four years' factory use. This experience shows that crude rubber which has been broken down in the presence of "RPA" behaves in much the same way as crude rubber which has been broken down by ordinary mastication, and shows a slight tendency to stiffen on storage.

Referring again to our analogy with accelerators, we see that just as the choice of a particular accelerator, the amount of use, and the time and temperature of cure is an individual matter which must be varied with the particular problem to be solved in the individual plant; so the particular method of utilizing the "RPA's" and the amount to be used is dependent upon the particular problem which is to be solved.

Influence of Other Ingredients

It is well known that many accelerators are affected in different ways by the various compounding agents used in producing rubber vulcanizates. We may, therefore, reasonably expect that the "RPA's" will be affected in various ways by the other ingredients normally used in the rubber stock. Our tests have shown that the normal fillers used in rubber such as channel black, clay, zinc oxide, and whiting do not interfere with the activity of the "RPA" provided the "RPA" is incorporated in the rubber before any of the filler is added. The antioxidants normally used in rubber retard the action of the "RPA's" slightly. Most of the accelerators also retard the softening action. Among the accelerators the aldehyde amines show the greatest retarding effect and the thiazoles the least. Sulphur practically completely stops the softening action of the "RPA's." Rather than being a disadvantage, however, this action of sulphur is of considerable advantage in the use of "RPA", since it gives a practical

method of controlling the softening action and prevents its continuing until such a soft condition is reached that the rubber is unusable for normal purposes.

The fact that the chemical softening agents continue to function in the presence of most of the mineral fillers has led to the development of the direct mixing of a rubber batch from unbroken down rubber through the assistance of "RPA." This method is adaptable either to Banbury mixing or mixing on a rubber mill. In carrying out this process the crude rubber is first placed on the mill or in the Banbury and the "RPA" added as soon as possible. In general it is advisable to allow a few minutes of mixing in order to insure the thorough dispersion of the "RPA" and to allow the softening action to start. The various ingredients are then added, withholding the sulphur, accelerators, and antioxidants until the end of the mixing cycle when the rubber has attained the desired degree of softness. As soon as the sulphur is added, further softening action by the "RPA" is stopped. This method of direct mixing from unbrokendown sheets through the assistance of "RPA" has proved to be one of the most important methods of utilizing these chemical softening agents.

Effects on Workability of Scrap

Every user of "RPA" is concerned with the effect of these chemical softening agents on the workability of his scrap. The answer to this problem rests fundamentally on the effect of sulphur in stopping the softening action of the "RPA's", which suggests that there should be no trouble due to continued softening on reworking scrap. The following plasticity determinations made on a typical footwear stock supply the quantitative answer to this question. In carrying out this test two batches of the stock were prepared, one in which the breakdown was produced only by mastication, and the second one in which 0.3% of "RPA" No. 2 was used to assist the breakdown. After the original mixing the plasticity of the control stock was 0.130-inch and that of the "RPA" stock 0.128-inch as measured by the Williams parallel plate plastometer. The stocks were allowed to cool and rest for 24 hours when they were subjected to a 10-minute milling period after which the control showed a plasticity of 0.100-inch and the "RPA" stock a plasticity of 0.107-inch. After cooling and resting for another 24 hours, the stocks were subjected to another 10-minute milling period after which the plasticity of the control was 0.095-inch and of the "RPA" stock 0.097-inch. This test shows conclusively that stocks processed with "RPA" No. 2 present no more difficulties in reworking scrap than do stocks which are prepared in its absence. In fact there is less change in plasticity on remilling of the "RPA" stocks than there is with the control stock.

Reduction of Power Consumption

We have been discussing the results obtained with the "RPA's" from the standpoint of decreased milling time and the resulting increase in production capacity and also from the standpoint of the greater uniformity and smoother production schedules obtainable through the use of a chemical softening agent. There is, however, one other factor which should not be overlooked and that is the saving in power brought about by the use of the "RPA." This power saving results from two factors, first the substitution of hot milling for the normal cold breakdown with its high power consumption and, second, the reduction in time of mastication required to produce any given degree of plasticity. We have made a study of the power consumption required in breaking down 22 pounds of rubber on a 30-inch mill and find that to obtain a Williams plasticity figure of 0.110-inch requires 8.68 kilowatt hours in the absence of "RPA" No. 2 and only 4.78 kilowatt hours when using 0.3% of "RPA" No. 2. This amounts to a 45% saving in power consumption for the breakdown of crude rubber.

Truck Tire Locking Rings Can Be Dangerous

THE Rubber Manufacturers Association, Inc., 444 Madison Ave., New York, N. Y., warns that serious injuries and deaths have resulted from truck tire locking rings blowing off rims and striking workmen who are inflating tires, but who have, in most cases, neglected to insure secure and proper fit of rings to rim bases and meanwhile stand or kneel in the "danger zone", facing the locking rings.

A typical accident follows. Two men repaired a truck tire tube, mounted tire and tube on the rim, made sure the tube had not been pinched, and, presumably, placed in proper positions the one-half inch snap-rings, but left the tire flat on the floor with the rings up.. Then the men inflated the tire, and when air pressure of nearly 75 pounds had been attained, the rings flew off the tire and rim, injuring one man's right arm, shoulder, and leg and throwing him 15 feet, whereupon he and the ring both struck his fellow worker, causing him to receive a fractured pelvis and bruises. After the accident the locking rings were examined and found in good condition, indicating correct procedure had not been followed during inflation.

To guard against such accidents the R. M. A. recommends the following procedure:

1. Examine all locking rings and rims and replace defective ones.
2. Deflate tires fully before removing or replacing the rings.
3. Place the locking ring firmly in correct position before admitting air to the tire.
4. Inflate to a pressure of only five or ten pounds to form the tire properly; then tap the locking ring lightly all around to make sure the tongue-and-groove sections of the ring and base are in alinement.
5. After increasing the pressure five or ten pounds, again tap the ring lightly to see that it remains properly seated.
6. Before further inflating the tire, place it with the locking ring down or facing away from the workman; extend the air hose through the side of the tire with the fixed rim and inflate to proper measure, observing the manufacturer's designated pressure and guarding against over-inflation.
7. Clean rust and corrosion from rims and lock ring before reapplying the tire.
8. Never remove an outside dual for servicing while the inside one is inflated unless the inside tire and rim are in normal and safe alinement. If dirt obscures the flange and lock ring, deflate the inner dual before loosening the wheel lugs.
9. The safest inflation practice is to use a clip on the air chuck, thus allowing the worker to move away from the tire. A chuck-type gage about six feet from the end of the air hose permits testing of air without being in the "danger zone."
10. Keep all tools in good condition.

Steel Wheels to Pneumatic Tires

THESE illustrations and instructions for converting tractors from steel wheels to pneumatic tires have been supplied to us by the Linde Air Products Co., 30 E. 42nd St., New York, N. Y. and are sufficiently complete to be of assistance when making this change. Illustrated are step-by-step procedures for cutting off the steel spokes and welding on new rims. Similar procedures should be followed when welding on felloe bands for use with demountable rims.

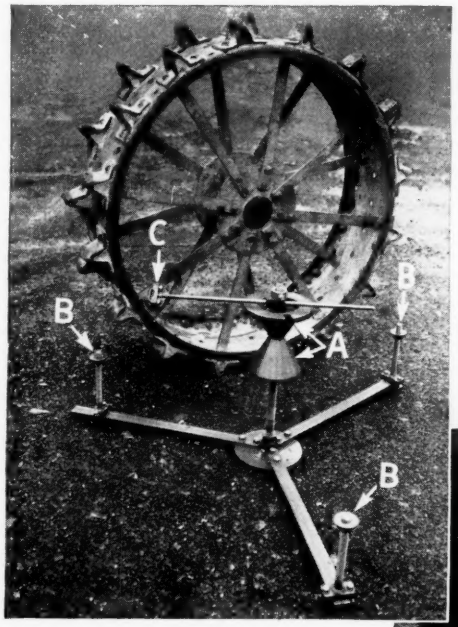


Fig. 1. *(Left)* **The Jig in the Foreground, Which Is Available from Rim Manufacturers, Makes Cut-Down Changeovers Simple, Accurate and Easy. Letters Indicate the Jig Parts, as Follows:** *(A)* **—Adjustable Steel Cones for Mounting Wheel Hub;** *(B)* **—Three Rim-Locating Table Nuts; (C)—Attachment for Holding Blowpipe**

Fig. 2. *(Right)* **Mount Steel Wheel on Cones of Jig, with the Three Table Nuts Supporting the Steel Felloe. Next, Determine the Rim Diameter and Mark Each Spoke with Chalk Where the Cut Is to Be Made. Attachment** *(C)* *(Above)* **Facilitates Scribing, or It Can Be Used for Holding the Blowpipe**

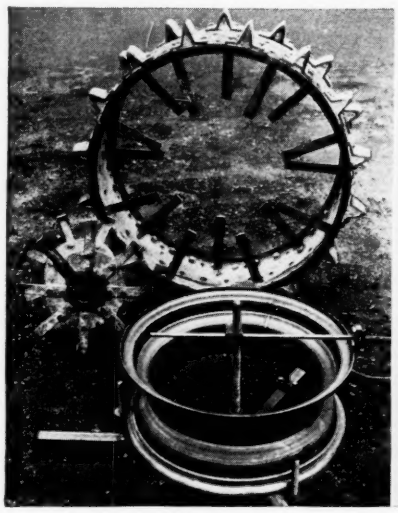


Fig. 3. The Spokes Have Been Cut and the Hub Removed from the Steel Wheel, Next Step Is to Place the Rim on the Locating Nuts, Making Sure that All Three Bolts Are the Same Distance from the Center. Height of rim with Respect to Height of Hub Depends on Tire and Rim Dimensions

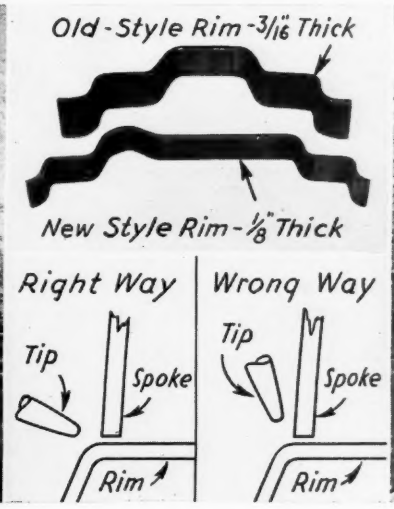


Fig. 4. Because Rims Are Now Made of Lighter Metal than Formerly, It Is Important Not to Overheat or Burn the Metal during Welding. The Blowpipe Flame Should Be Directed More toward the Spoke than Toward the Rim *(See Sketch)*. **No Difficulties Should Be Experienced If This Is Done**

Fig. 5. After Bending, If Necessary, Weld Three Spokes Tightly at 120 Degree Intervals. Then, Using the Blowpipe-Holding Attachment, Check the Alinement for Both Wobble and Being Off-Center. If Alinement Is Correct, Weld the Balance of the Spokes Alternately on Opposite Sides of Rim

Expenditures for Plant and Equipment

For the Rubber Products Industries Group: 1939

ESTABLISHMENTS which accounted for 98.1% of the value of products manufactured in the Rubber Products Group of industries reported total capital expenditures for plant and equipment for 1939 amounting to $29,287,155, according to preliminary figures compiled from the returns of the 1939 Census of Manufactures, taken in 1940, and released by Acting Director Vergil D. Reed, Bureau of the Census, Department of Commerce. The remaining establishments, which accounted for 1.9% of the total value of products of these industries, did not report any expenditures for plant and equipment during 1939.

The Bureau of the Census obtained for the first time information on the expenditures for plant and equipment made by manufacturing establishments. Such establishments were requested to report charges to capital account for new depreciable assets at cost value.

Data were supplied upon the total expenditures for plant, equipment, and real estate during the year under three detailed types:

1. Expenditures for new construction or major alterations of buildings and other fixed plant and structures (buildings, docks, tracks, etc.), including elevators, heating and ventilating equipment, etc., essentially a part of buildings or other fixed structures.

2. Expenditures for new machinery and operating equipment, including all new motors, lathes, punch presses, cranes, automobiles, trucks, railroad rolling stock, office fixtures, furniture, typewriters, billing machines, cash registers, and other movable equipment.

3. Expenditures for plant and equipment acquired in a "used" condition from other owners, and expenditures for land.

The major portion of these expenditures represented purchases of new machinery valued at $23,779,530, or 81.2% of the total. The cost of new construction was $3,748,593, or 12.8% of the total, and of plant and equipment acquired in a "used" condition and land, $1,759,032, or 6% of the total.

The expenditures for plant and equipment shown in this table include only expenditures reported by establishments engaged in active production during 1939. They do not include expenditures by inactive establishments or new establishments whose plants were under construction during 1939, but were not completed and actually in use during that year.

Summary statistics for 1939 for the group and for each of the four industries are shown in the following table.

The Rubber Content of Automobiles[1]

HOW much rubber is used in the manufacture of an automobile? Estimates vary. The amount entering into the manufacture of tires and tubes, its almost obvious use, is well known; the amount used otherwise, however, is unknown.

Data contained in the following table have been obtained from both official and unofficial sources and by estimates: data in the first column were obtained from the Census of Manufactures conducted by the Bureau of the Census.

The first three items in the second column were supplied by the Rubber Manufacturers Association; the remaining percentages are estimates; column three contains data arrived at by applying the percentages in column two to Census data in column one.

RUBBER PRODUCTS USED IN ORIGINAL AUTOMOBILE EQUIPMENT
(Estimated in Thousands of Dollars)

	Total Output* 1939	% Used in New Cars	Total Used in New Cars
Tires and tubes:			
Passenger-car casings	$269,241	31.0	$83,500
Truck and bus casings	155,835	33.7	52,550
Inner tubes (car, truck bus)	52,511	37.1	19,480
Total casings and tubes used as new car equipment	.....	...	$155,530
Other rubber goods:			
Automobile and carriage fabrics	1,710	25.0	428
Motor-vehicle V-belts	5,281	25.0	1,320
"All other" rubber hose	17,329	10.0	1,733
Rubber tubing	2,609	10.0	261
Rubber and friction tape	4,339	5.0	217
Molded articles for motor vehicles	10,385	90.0	9,346
Mechanical rubber goods, n.e.s.	32,180	5.0	1,609
Rubber mats and matting	11,210	20.0	2,242
Battery jars, boxes, and parts	11,683	30.0	3,505
Sponge rubber products, n.e.s.	11,126	10.0	1,113
Tire sundries and repair materials	8,816	10.0	882
All other rubber manufactures, n.e.s.	36,126	2.0	723
Insulated wires (rubber-insulation value est.)	.....	...	4,000
Total, of other items used as new car equipment	.....	...	$27,879

*Source: Bureau of the Census.

[1] Abstracted from an article by E. G. Holt in *Domestic Commerce*, May 1, 1941, pp. 442-43.

	Rubber Products Group		Tires and Inner Tubes Industry		Rubber Boots and Shoes Industry		Reclaimed Rubber Industry		Rubber Products Not Elsewhere Classified Industry	
	Number or Amount	% of Group Total	Number or Amount	% of Industry Total	Number or Amount	% of Industry Total	Number or Amount	% of Industry Total	Number or Amount	% of Industry Total
Total number of establishments	595	100.0	53	100.0	13	100.0	10	100.0	519	100.0
Number of establishments reporting capital expenditures for plant and equipment	464	78.0	52	98.1	11	84.6	10	100.0	391	75.3
Total value of products	902,328,802	100.0	580,928,993	100.0	49,980,591	100.0	6,894,018	100.0	264,525,200	100.0
Value of products of establishments reporting expenditures for plant and equipment	884,870,370	98.1	580,826,793	99.9	48,634,719	97.3	6,894,018	100.0	248,514,840	93.9
Total expenditures for plant and equipment	29,287,155	100.0	17,047,672	100.0	1,535,630	100.0	431,270	100.0	10,272,583	100.0
Expenditures for new construction, or major alterations of buildings and other fixed plant and structures	3,748,593	12.8	1,316,484	7.7	155,691	10.1	200,415	46.5	2,076,003	20.2
Expenditures for new machinery and operating equipment	23,779,530	81.2	15,478,132	90.8	1,353,901	88.2	228,838	53.1	6,718,659	65.4
Expenditures for plant and equipment acquired in a "used" condition from other owners and expenditures for land	1,759,032	6.0	253,056	1.5	26,038	1.7	2,017	0.5	1,477,921	14.4

The Ford Rubber Plantations—II[1]

OF THE 844 houses at Belterra, 758 are of palm construction and used to house married laborers. There are also eight palm barracks and seven permanent barracks for single laborers with accommodations for 950 men. The American staff village has five houses, a club house, and a home for single men. These houses are of frame construction, but are fully as modern as those at Fordlandia. Two additional houses of like size and construction are located directly across from the hospital for the use of doctors. The Brazilian staff members are housed in a group of 17 homes slightly smaller than those of the American village, with a separate home for single men of this staff.

There are 33 frame houses for workmen and foremen in Belterra, and also six houses of concrete block construction and sixteen permanent houses of frame and sheet metal. Ten of these are for two families. Practically all of the permanent houses are tile roofed. Under construction is a new village of 52 double permanent houses with a church, stores, a new major school, and a recreation building. The school building will be located in the center of a park of trees and palms.

Recreation and Gardens

At Fordlandia there is a swimming pool for the Brazilians in addition to the one in the American village. There are football fields and a recreation building for dances, parties, and movies.

Because of the broad sandy beaches at both Pindobal and New Port on the river, swimming pools are not necessary at Belterra. Here also is a nine-hole golf course; while pool, cards, and ping pong are indulged in at the club which is also equipped with a very fine radio and library.

Five regulation soccer football fields are located around the plantation, also two recreation buildings and a third in the course of construction. The first two have movie screens, and the new building will be equipped with a stage as well. There are two outdoor movie screens, and movies are shown weekly at three different locations on the plantations. These are shown on consecutive nights, thus enabling employes and their families to view all pictures which are received at the plantation. The Brazilians like to dance, and the recreation buildings are extensively used for this purpose.

Gardening is encouraged at both plantations by offering prizes for the best school-boy gardens and in conjunction with an annual yard and garden contest which is held during the Independence Day celebration on September 7. Last year 28 cash awards were made at this affair. All houses are spaced to allow of ample latitude for both flower and vegetable gardens. To further abet this program educational advice and seeds are furnished, and the aid to health of a vegetable diet is stressed.

Experiments are made to increase the variety and quality of foodstuffs. Research departments at both plantations operate vegetable gardens, and the produce is sold through their stores department; this department also handles the ordering and sales of all American foodstuffs brought to the plantations, as well as the fruit from the orchards at Fordlandia and the product from their ice plant.

[1] Data and illustrations received from A. Johnston, of Cia. Ford Industrial do Brasil, Dearborn, Mich.

Concessionaires

With exception of the items listed above and drugs, all food, clothing, and other merchandise is sold by merchants who have been granted concessions and who are governed by rules and prices dictated by the company. No food prices can be increased without the company's permission, which is granted only when evidence is submitted showing that wholesale prices have advanced to a point where the margin of profit is not sufficient for the conduct of good business.

In order to insure an ample supply of fresh meat there are fenced pastures at both plantations which the meat concessionaire is required to keep stocked. All cattle are inspected, as is the butchered meat, by the medical department, whose approval is necessary before any meat can be sold. The meat requirements at Belterra are from 40 to 50 head a week; while at Fordlandia it ranges from eight to ten head a week.

This Brazilian seedling has both low and high budding. The lower budding, which comprises the main trunk section, is of a high yielding clone; while the top budding is of *Hevea Guyanensis* which, although a low yielding species, is immune to destructive South American leaf disease

This area at Belterra has been felled and is now ready to be burned

Felling gangs such as the one pictured prefer to work on contract and carry out their job before sun-up and after sun-down. It takes 30 days for 20 men to clear 40 acres of jungle

A number of peddlers who come to the river front by canoe and others to the plantation by horse through the jungle trails are required to have their foodstuffs inspected before they can be offered for sale. Every effort is thus made to improve both the health and economic condition of the employes.

Employes and Their Training

There are approximately 2,500 employes at the plantations, of which 261 are women and 60 are boys. The women and boys are assigned lighter tasks, such as raking, caterpillar and pest inspection, and nursing. This is probably the only place in the world today where a man can come and, if physically fit, secure work immediately. The future expansion program depends largely on ability to hire and train help. For this reason no likely looking prospect is turned away.

There are two employment offices, one on the plateau and one at New Port, on the water front. Prospective employes are sent through a medical inspection; if satisfactory they are photographed for the company employment record and given a place to live.

There are between six and seven thousand inhabitants on the plantations, including the families of concessionaires and their employes. The housing, feeding, and health of all these people is a company responsibility. Many questions arise, some amusing and some pathetic, but all important.

Burials must be arranged in accordance with the laws of Brazil, which require interment within 24 hours after death. There are company cemeteries at both plantations, and deceased employes are laid away at company expense, with a slight charge for dependents.

Food prices must be controlled. The company subsidizes the sale of *farinha,* one of the chief foods of the laborer, in order to hold the cost to the employe at a fair price. Mandioca from which *farinha* is made is planted at each plantation, and manufacturing plants have been installed to convert this foodstuff. Production last year took care of approximately 50% of requirements. The acreage is being increased this year to provide for the total requirements of *farinha.*

The cattle pastures have been enlarged at both plantations, and tentative plans made to raise their own cattle if prices increase beyond the purchasing power of the employes.

The plantations operate their own sawmill, which produces 45,000 board feet of lumber a month. They have complete machine and carpenter shops, steam shovels of various capacities, caterpillar tractors, road rollers both large and small, graders, and miscellaneous equipment.

The operators and maintenance men for this varied equipment are all trained by the company as are carpenters, construction men, electricians, masons, cement workers, plantation labor of all kind, the employes of the cement block plant, garage men, truck drivers, and store and stock men. Men in the carpenter and wood working departments could now qualify as cabinet makers in any shop in the United States. In fact a portion of the furniture at the plantations has been fabricated in their own shops from jungle trees. All advanced training and promotion are based on merit alone.

Plantation

Belterra is laid out in square blocks of 40 acres each. The corner post is placed diagonally, with the four sides facing the different blocks at a 45-degree angle. The blocks are numbered, and the clone numbers of the rubber in the block are painted on the faces of the post. The roads are at six-block intervals; these also are numbered, with the east and west roads carrying the odd numbers, 1, 3, 5, etc., and the north and south roads, 2, 4, 6, etc.

Clearing

Jungle areas to be cleared are first lined by rough trails along the block lines. The area is then underbrushed, cutting down all material up to four inches in diameter, after which the remaining larger growth is felled on the bed of underbrush. All branches of the larger trees are cut off in order to make a more complete burn. Felling operations are made during the latter part of the rainy season or the first part of the dry season, and the felled jungle is permitted to dry out for three months. The area is then burned, and if the time of burning and the placing of the fire are well controlled, the area is ready for planting. If however, a good burn does not result, a further clearing operation is required.

Maintenance

As soon as the felled jungle has been burned, an employe is assigned to each 40-acre block to cut down all grass and weeds that spring up. Creeping leguminous cover is used in heavy grass areas to smother out the growth; this cover has to be drastically controlled and is used at Belterra only in areas where maintenance cost is

excessive. Fordlandia is planted completely to cover crop, however, as it not only reduces maintenance, but retards soil erosion on the hillsides.

Planting and Budding

Two-foot-square planting beds are laid out on a 15- by 15-foot equilateral triangle; the trees are 15 feet apart in the rows, and the rows 13 feet apart; this will result in a total of 220 trees per acre. The beds are first dug up with a grub hoe to a depth of 12 inches, and all roots are removed. Then six seeds are planted in each bed during the early part of the rainy season, and three seeds are planted in each of two rows spaced 12 inches apart. As the seeds grow, the number of seedlings per hill is gradually diminished until at the end of one year only the two most vigorous seedlings remain to be budgrafted.

On the first round, only one of the seedlings in each hill is budded, and if this is successful, a period of time is allowed to pass, sufficient for the firm establishing of the new shoot, after which the second seedling is removed from the hill. If the first bud does not grow, both seedlings are budded on the second round, and the more vigorous one is allowed to remain, while the weaker one is removed.

Approximately five years after budding the trees are test-tapped to determine the high yielders. This tapping is continued at intervals for the next two or three years, or until the trees reach a size for regular tapping. At this time the number of trees is reduced from over 200 per acre to 100 trees per acre. Any trees indicating low yield are removed prior to the regular tapping period.

Growth

The growth of rubber trees in the Amazon Valley is much slower than in the Far East where there is a more even distribution of rainfall. While the total rainfall in Brazil is comparable with that of the Far East, there are heavy rains during the rainy season and a very extended dry season during which there is no rainfall. For this reason seven to eight years after budding will be required before the trees can be brought into regular tapping.

Selection

The selection of clones for multiplication and budding is of utmost importance. Although 53 different clones were imported in 1934, there are but six used extensively at Belterra. However, practically all of the clones are planted in limited quantities for observation. As time goes on, this number will be further reduced, but will be supplemented by a number of clones which are now being developed. As stated, the difference in conditions in the Far East and the Amazon Valley has a very marked effect on growth; in fact, there is a difference of several weeks in the time of the rainy season between Fordlandia and Belterra although but 80 miles apart. A number of species that are satisfactory at one plantation are not considered for the other.

Research—Pests—Diseases

Research is carried forward steadily at both plantations. The millions of trees are continuously under observation for diseases and pests with which the rubber trees of the Amazon Valley are afflicted. Volumes could be written concerning these problems and the remedies applied. Suffice to say that pests that attack the trees at Fordlandia may not offer a serious problem at Belterra and those that abound at Belterra may not exist at Fordlandia.

For instance, various types of caterpillars are prevalent at Belterra during the rainy season. These feed on the young rubber leaves, and their control is essential. These have never offered a serious problem at Fordlandia as they are preyed upon by fire ants, and fire ants are plentiful at Fordlandia. Unless one has been bitten by a flock of fire ants, his education in "Antology" is very incomplete. There is a story of the inhabitants of Aveiro who had to abandon the town for over two years because of the prevalence of fire ants.

Sauba-ants are one of the worst pests at Belterra; they cut off the leaves of the rubber tree and, if not controlled, eventually kill the tree. By the use of Cyanogas they are able to keep them well cleaned out. However constant watch must be maintained throughout the plantation.

South American leaf disease, a fungus, is the most serious of the diseases. It attacks the new foliage during the rainy season, causing the leaves to wilt and droop. This greatly retards the growth of the tree and in the more severe cases causes die-back. In addition there are black crust, another fungus growth, the red spider or mite, yellow scale, and some five other scales existing in a lesser degree. Last, but by far not the least of the pests, is the lace bug whose only diet is the juice from the rubber leaves. This pest was unknown before the start of the plantation at Fordlandia.

Added to these are a number of root diseases. The most difficult to handle is canker. White root disease is

This native at Belterra is planting a rubber seed at stake

This scene at Belterra shows a nursery of budwood

This area at Fordlandia is ready for tapping now

prevalent to some extent. The research department is carrying on a continuous fight against these and other ailments which are almost as plentiful as those with which the human race is afflicted, but no more than found in rubber areas of the Far East.

Resistant Species

During the battle against the diseases and pests, it was noticed in 1935 that certain individual trees were outstanding in their resistant qualities to both diseases and pests. These trees were of the poorer grade of *Hevea Guyanensis* and *Hevea Spruceana*. In order to make use of their resistant qualities the idea was conceived of top-work budding. A number of these were made in 1936 and are now being test-tapped to determine the effect of the resistant crowns on the quality of the rubber. Indications to date are very encouraging.

Leaf System

The leaf system is of vast importance in the functioning of the tree. The leaves draw the moisture from the earth through the root system and the woody portion of the trunk; they combine this with carbon dioxide taken from the air to form not only the plant food on which the tree thrives, but also the hydrocarbons which are the main ingredient of latex. The plant food is distributed to the portion of the tree requiring food through a separate set of veins or vessels contained in the base or bark. The more prolific the leaves are the more vigorous the tree will be, and the greater the yield of latex.

Plantation Crops

Test tapping of the 240 acres of seedling rubber at Belterra will start this year to determine the high-yield trees and the thinning out of the low yielders. Commercial tapping will not start at Belterra until 1943 when it is estimated that 400 acres of trees will have reached sufficient size. The trees coming into production will increase rapidly after 1943 until the total of the present plantation will be in commercial tapping during 1948. It is estimated conservatively that between forty and fifty million pounds of rubber will be produced during the next ten years and by that time they will be averaging over 1,000 pounds per acre per year, or well over twelve million pounds of dry rubber.

Also 180 acres of 14 different varieties of castor have been planted, and the plantation is just starting to extract the oil to determine the best variety. There are 100 acres of mandioca planted on the plantations. The root from this plant is used to manufacture *farinha*, although it has a high cyanide content and must be soaked through a number of waters and toasted to remove the cyanide before being suitable as a foodstuff. The water from the soaking operation is an excellent insecticide and is used to kill lace bugs, red mites, and sauba-ants.

Timbo is grown at both plantations. Thirty acres are planted at Belterra and 18 at Fordlandia. The root of this plant is pressed to secure the poisonous resin "Rotenone", which is also used as an insecticide in the battle against lace bug and red mite. Timbo is grown quite extensively in the river valleys of Northern Brazil for export to the United States and the manufacture of antiseptic soap.

These matured trees at Fordlandia are now being tapped

President Vargas of Brazil addresses staff in Belterra clubhouse during a visit there last year

Space is not available to describe all of the crops or their uses. In addition to the above there are teak wood, balsa, Brazilian cedar and mahogany, eucalyptus, kapok, Tamarind, sisal, Manilla hemp, jute, cinnamon, ginger, cocoanut, oil palm, cacao, tea, coffee, and many others too numerous to mention. The orchards contain oranges, tangerines, grapefruit, pineapple, banana, and cashew.

Visit by President Vargas

Last year the plantations had the extreme honor of entertaining President Getulio Vargas and prominent members of his government. He told the employes that not only did Mr. Ford meet the requirements of his labor legislation, but that he went far beyond the requirements in the treatment and care of his employes. He also stated that had he failed to visit the plantations, his tour of the Amazon Valley would have been incomplete. The night following his visit, the President in a broadcast speech to the people of Amazonas, at Manaos, stated that the only place he found in the interior with proper sanitation and healthy people was at Mr. Ford's plantations.

Distributers' Tire Stocks in the United States, April 1, 1941[1]

E. G. Holt[2]

THE results of the seventeenth quarterly survey of retail stocks of automobile tires and inner tubes, as of April 1, 1941, are shown below in comparison with summary data for preceding quarterly surveys. The bases are methods described in earlier reports have been used in calculating the stocks held by the following three groups of distributers: 1. Individual dealers, including large and small retailers. 2. Distributers through oil-company chains of filling stations. 3. Manufacturer-owned-and-operated stores, mail-order houses, and other important retail chains.

Distributers' Stocks by Surveys

Total distributers' stocks of motor-vehicle casings are estimated at 7,686,000 on April 1, 1941, the increase of 376,000 over January 1 being merely a customary first-quarter increase. Increased stocks were reported by each of the three groups of distributers. Stocks of casings on April 1, 1941, were 137,000 higher than on the same date in 1940, giving no evidence of excessive stocking by distributers. Dealers of casings stocks during recent quarters are as follows:

	Thousands of Casings			
Month and Day	Dealers	Oil Companies	Other	Total
1941				
April 1	3,367	1,858	2,461	7,686
January 1	3,248	1,772	*2,290	*7,310
1940				
October 1	3,139	1,790	2,341	7,270
July 1	3,281	1,796	2,982	8,059
April 1	3,312	1,755	2,482	7,549
January 1	2,996	2,000	2,014	7,010
1939				
October 1	3,122	1,487	2,250	6,859
July 1	2,900	1,646	2,356	6,902
April 1	3,018	1,725	2,074	6,817
January 1	2,735	1,838	1,920	6,493
Annual averages:				
1938	2,844	1,976	2,031	6,851
1937	3,399	1,874	2,298	7,571
1936	3,500	1,650	2,000	7,150

*Revised.

The total distributers' inventory of inner tubes increased 919,000 during the first quarter of 1941; the dealers' stock increase accounted for 658,000, making the total the highest since April, 1938. The total increase in the first quarter of 1940 was 346,000 tubes; in 1939 there was a decline on April 1 as compared with January 1. Current tube stocks are 470,000 greater than on April 1, 1940. Estimated distributers' stocks of tubes are summarized below.

	Thousands of Inner Tubes			
Month and Day	Dealers	Oil Companies	Other	Total
1941				
April 1	3,948	1,561	1,810	7,329
January 1	3,290	1,541	*1,579	*6,410
1940				
October 1	3,029	1,501	1,754	6,284
July 1	3,486	1,446	1,799	6,731
April 1	3,551	1,487	1,821	6,859
January 1	3,310	1,671	1,532	6,513
1939				
October 1	3,220	1,406	1,793	6,419
July 1	3,206	1,393	1,829	6,428
April 1	3,460	1,626	1,588	6,674
January 1	3,445	1,733	1,599	6,777
Average, 1938	3,565	1,908	1,739	7,212

*Revised.

Dealers' Reported Stocks

Stocks reported by 1,272 individual dealers for 1,734 stores in the current survey are compared below with details for the same firms on January 1, when they reported 1,728 stores. The small dealers again reported reduced stocks, while those with over 200 casings report higher stocks of casings and tubes, particularly the latter, resulting in the over-all increase reflected in the index numbers.

			January 1, 1941	
Casings	Dealers	Stores	Casings	Tubes
Under 200	811	918	71,402	94,148
200 to 500	265	392	78,592	81,166
Over 500	196	418	242,796	230,923
Total	1,272	1,728	392,790	406,237
Index number	....	....	92.8	....

			April 1, 1941	
Casings	Dealers	Stores	Casings	Tubes
Under 200	811	902	67,559	91,238
200 to 500	265	387	81,528	86,795
Over 500	196	445	257,949	274,174
Total	1,272	1,734	407,036	452,207
Other April	291	404	71,409	108,614
Total April	1,563	2,138	478,445	560,821
Index numbers	....	....	96.2	112.8

Other Mass Distributers' Stocks

Reports were received from six tire manufacturers operating 2,039 retail stores and covering 1,003,127 casings and 700,018 tubes held in these outlets. These stocks are also included in manufacturers' inventories as reported by The Rubber Manufacturers Association, Inc.

Additional reports were received from 11 other mass distributers, operating 2,220 retail outlets, (and/or doing mail-order business) and covering their total stocks.

Stocks of both casings and tubes were increased by both these groups of mass distributers during the first quarter. Revised January 1 estimates of total stocks have been included in the summary estimates, to cover additional firms reporting for the first time in this survey.

MASS DISTRIBUTERS' REPORTED STOCKS, 1941

Items	January 1	April 1
Number of firms	15	17
Number of stores	4,175	4,259
Casings	2,250,437	2,460,905
Tubes	1,555,354	1,810,187

The support of The Rubber Manufacturers Association, Inc., the assistance of the National Association of Independent Tire Dealers, and the prompt cooperation of dealers, oil-company distributers, manufacturers, and other mass distributers in submitting data used in this report are gratefully acknowledged. We especially thank the increasing number of dealers who have submitted data and urge them to report regularly in future, as regularity is essential to trustworthy estimates of total dealers stocks. The survey is open to participation by any tire dealer.

[1] *Industrial Reference Service*, May, 1941, No. 23, U. S. Department of Commerce, Washington, D. C.

[2] Division of Industrial Economy.

Stocks of Special Dealer Groups

Stocks reported by 110 New York dealers with 147 stores in this survey aggregated 53,379 casings and 94,337 tubes; returns comparable with January 1 indicate increases corresponding closely with the general dealer trend. Reports for dealers handling tires of particular make were also compiled in three instances, and these reports likewise followed the general trend with the following exceptions: small dealers showed increased casings stocks for one make, and the large-dealer group showed reduced casings stocks for one make and reduced tube stocks for another. The foregoing table includes data mentioned in this paragraph.

Oil-Company Distributers' Stocks

Comparative returns were received from 36 firms in the oil-company distributers' group. Some reports covered stocks in central warehouses only; while others also covered stocks in about 20,000 retail outlets. A sharp increase in stocks of casings and a small increase in inner tubes occurred during the quarter.

OIL-COMPANY REPORTED STOCKS, 1941

Items	January 1	April 1
Number of firms	36	36
Casings	1,010,047	1,060,868
Tubes	854,741	890,739
Index numbers:		
Casings	107.4	112.6
Tubes	....	94.6

Rubber Consumption and Year-End Stocks—1940[1]

THE final official estimates of 1940 consumption of crude rubber in the United States, determined through the survey conducted by the Bureau of Foreign and Domestic Commerce, shows an increase of 9.5%, or 56,500 long tons over the 1939 official estimate of 592,000 long tons. The year-end stocks of crude rubber determined in this survey show an increase of 163,100 long tons during the year, or nearly 130% increase.

The following table shows the statistics in balance sheet form, in long tons:

CRUDE RUBBER BALANCE SHEET, 1940

Available supplies:			
Stocks, December 31, 1939			125,800
Imports—Latex	33,789		
Guayule	3,634		
Crepe sole	382		
Other	780,819		
Total		818,624	
Reexports		7,060	
Net imports			811,564
Total to be accounted for			937,364
Consumption:			
Reported direct (542 firms):			
Latex, dry weight		25,210	
Other crude rubber		599,986	
Indirect reports:			
Latex		3,790	
Other crude rubber (32 firms)		6,436	
Estimated, to balance		13,078	
Total			648,500
Year-end stocks:			
Reported direct:			
Government agencies		112,494	
Manufacturers (496)		142,904	
Importers and dealers (36)		28,986	
Indirect reports:			
Manufacturers		665	
Estimated, to balance		3,815	
Total			288,864
			937,364

Of the 937,364 long tons of rubber in 1940 available supplies, 920,471 long tons were accounted for under 1940 consumption and year-end stocks. The 16,893 long tons unaccounted for were divided as follows: 13,078 tons estimated consumption and 3,815 tons estimated stocks.

Statistics of rubber consumption (unadjusted figures) compiled by the Rubber Manufacturers Association have been adjusted to the 1940 total consumption of 648,500 tons estimated in this report, and month-end stocks have been calculated from the officially reported monthly net imports of crude rubber.[2] The adjustment for imports of crepe sole rubber was applied to the December figures.

While 209 firms reported latex consumption as a separate item, it is known that there is a considerable use of latex by firms which are outside the rubber industry, and the 25,210 tons reported is not fully representative. Considering these factors and certain confidential data received, the conclusion was reached that 1940 latex consumption was approximately 29,000 tons. This would indicate addition to latex inventories during 1940, comparing consumption with the imports of 33,789 tons, although some reexports occur, latex reexports are not separately recorded.

Domestic consumption of reclaimed rubber[3] in 1940 is estimated at 190,244 long tons, an increase of 20,244 tons or 11.9% over 1939. Year-end stocks of reclaim are estimated at 31,089 long tons, the increase during 1940 being substantial, but less than indicated by trade reports.

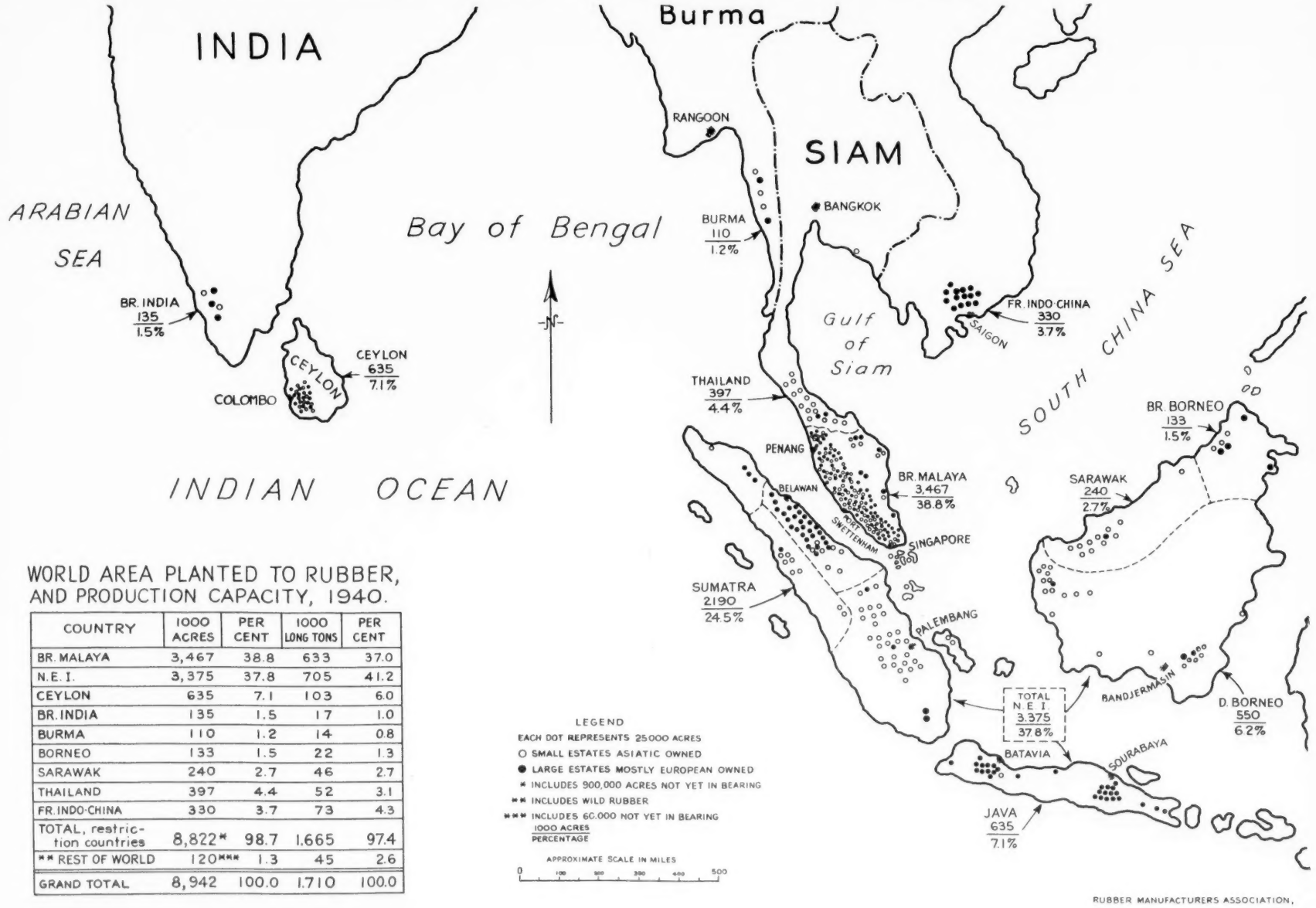
Production of reclaim in 1940 was reported by 36 companies at 205,253 long tons, which with the December 31, 1939, stocks of 25,250 tons gave a reported available supply of 230,503 tons. Consumption of reclaim was reported by 337 companies at 186,844 tons, and manufacturers and reclaimers reported year-end stocks to the amount of 30,489 tons, in addition to which 11,347 tons were exported. This accounts for 228,680 tons.

It is believed that some production, consumption, and stocks were unreported, and on this account the total consumption estimate is increased 3,400 tons; year-end stocks increased 600 tons, and production increased 2,177 tons, above the actually reported statistics mentioned in the preceding paragraph. The unreported production is assumed to represent operations of firms which produce for their own consumption. The unreported consumption and stocks estimates are based on and in proportion to the volume of unreported crude rubber consumption discussed earlier in this report.

The questionnaire used in this survey asked each manufacturer of rubber products to report consumption of synthetic rubber (neoprene, "Thiokol", and Perbunan types) as a separate item. Statistics were reported by 195 manufacturers, showing a consumption of 2,375 long tons.[4] This reported consumption is definitely incomplete. Fifteen firms reported consumption in excess of 100,000 pounds each in 1940, accounting for 1,397 long tons or 59% of the total reported. Exports of synthetic rubber were officially recorded for the first time during 1940 to the extent of 340 tons, chief destinations being England, Canada, and France (early 1940 shipments).

[1] Abstracted from an article by E. G. Holt in *Industrial Reference Service* Part 10, Rubber and Its Products, No. 22, Apr., 1941.
[2] EDITOR'S NOTE. These revised statistics are shown in our table, "United States and World Statistics of Rubber Imports, Exports, Consumption, and stocks," p. 88.
[3] EDITOR'S NOTE. Revised reclaim statistics are shown in our table on page 82.
[4] EDITOR'S NOTE. Last year the Bureau of Foreign and Domestic Commerce estimated synthetic rubber consumption for 1939 at 1,700 long tons and for 1938 at 814 long tons.

Rubber Growing Areas in the Far East



WORLD AREA PLANTED TO RUBBER, AND PRODUCTION CAPACITY, 1940.

COUNTRY	1000 ACRES	PER CENT	1000 LONG TONS	PER CENT
BR. MALAYA	3,467	38.8	633	37.0
N.E.I.	3,375	37.8	705	41.2
CEYLON	635	7.1	103	6.0
BR. INDIA	135	1.5	17	1.0
BURMA	110	1.2	14	0.8
BORNEO	133	1.5	22	1.3
SARAWAK	240	2.7	46	2.7
THAILAND	397	4.4	52	3.1
FR. INDO-CHINA	330	3.7	73	4.3
TOTAL, restriction countries	8,822*	98.7	1,665	97.4
** REST OF WORLD	120***	1.3	45	2.6
GRAND TOTAL	8,942	100.0	1,710	100.0

RUBBER MANUFACTURERS ASSOCIATION,

EDITORIALS

Rubber Imports and Prices

THERE has been a phenomenal rise of approximately 20% in the United States consumption of crude rubber from December, 1940, to the all-time record consumption of 71,374 long tons in April, 1941; while total stocks rose only 14% to 329,767 tons at the end of April. However during this period gross imports to this country were well ahead of consumption, with the exception of the month of April when imports dropped to 63,305 tons in comparison with an average monthly figure of 82,643 tons for the previous three months. The low April importation was the result of the low shipments in February as is indicated by the low rubber tonnage afloat of 136,955 tons at the end of February and 140,228 tons on March 31 in comparison with over 153,000 tons at the end of January and of April. Knowledge of this situation in February prompted a full realization of the shortage in ship tonnage which had occurred before the greater consumption had been sufficiently maintained to indicate continued requirements at such an expanded rate as has since been in evidence.

As the export quota starting January first had been set at 100%, it was evident that ample rubber was available and that the problem was one of providing sufficient tonnage to transport the desired rubber to this country. Consequently arrangements were then made for a close control of shipping facilities and by cooperation between consumers and proper governmental agencies additional tonnage was allocated to rubber, and a system was set up for scheduling boats specifically for this purpose and in some cases ending the voyage at Pacific Coast ports.

It is now understood that, unless unforeseen conditions arise, future shipping schedules provide for monthly arrivals of crude rubber in this country of around 100,000 tons for the months of May through September with the exception of August when the imports are expected to drop appreciably for the month, but still to be well in excess of the present rate of consumption. The expected lesser June shipments, which approximately constitute the August arrivals, are the result of circumstances in regard to boat location whereby an even distribution over all months appears impossible. Present indications are that the May and July shipments will considerably offset the lower June shipments.

Information regarding the low April arrivals and the low scheduled June shipments became known at about the same time in May, and this knowledge together with the known shortage of available trade rubber had a definite influence on the New York market and contributed to the sharp advance in price. The reduction in rubber holdings by New York importers and dealers from 90,410 tons at the end of 1937 to 31,818 tons on December 31, 1940, was lowered further to 9,875 tons at the end of April, presumably because of the growing shortage of ship tonnage.

In view of the present plans for providing ships to carry rubber and the probability of a more extended practice of shortening the ocean trip by unloading at the Pacific Coast along with the recent statement by Jesse Jones that the Rubber Reserve Co. is still buying rubber at 20¢ per pound or less and the fact that the reported declared value (at point of shipment) has remained under 18¢ per pound since 1937, there appears to be no justification for any extension or even a repetition of the high prices reached on the New York market during May. This conclusion is borne out by the decline in New York prices, starting May 19 and coincident with rumors of control negotiation by the Government with the Commodity Exchange, which later resulted in an agreement for a per contract margin of $1,200 on speculative accounts.

Will Inflation Be Halted?

IN THE May 15 issue of *Domestic Commerce*, Donald M. Nelson, Director, Division of Purchases, O. P. M., stated, "We are conducting this defense program on the belief that we do not need an era of constantly rising prices in order to bring out our nation's maximum productive effort. In other words, price inflation of the kind we saw in the last war is going to be avoided."

There are two basic causes of higher prices: namely, profiteering and increased cost of production. Untouched raw materials have no useful value, and only after work has been performed on them do they have any worth. Therefore labor is the variable and controlling factor in real cost of production. The worker is entitled to a reasonable profit or remuneration for his services just as is the financial investment which permits payment for labor in advance of the sale of the product. The difference between a so-called legitimate reward and the effects of profiteering often lies in a definition of what is reasonable or legitimate.

Presumably Mr. Nelson referred to the elimination of profiteering, otherwise known as exhorbitant profit. Profiteering can be and often has been practiced by those who personify labor as well as those who supply the capital investment. If higher prices are to be avoided, the reward for labor performed and for money used as finances must both be prevented from increasing. Maintaining of the *status quo* of either alone will not avoid higher selling prices. We have heard much about the necessity for capital to forego any increase in returns, but the present general trend toward higher wages proves false any supposition that higher prices can be prevented indefinitely unless the reward to money invested declines sufficiently to offset the increased reward for work or unless the present trend to higher labor costs is rectified.

S. C. Stillwagon

EDITOR

What the Rubber Chemists Are Doing

Rubber Division, A. C. S., Activities

Photos by Allyn K. Thayer

Arthur Neal **E. J. von der Heide** **Andrew Hale**

Presenting the Technical Program at the Buffalo-Ontario Meeting

Buffalo and Ontario Groups Meet Jointly in Canada

AN OUTSTANDING success, the first joint meeting of the Buffalo Group, Rubber Division, A. C. S., and the Ontario Rubber Section of the Canadian Chemical Association was held on May 1 at the General Brock Hotel, Niagara Falls, Ontario. Among the 240 members and guests present at dinner and the 270 at the technical meeting were a number of visitors from the New York and Akron areas.

The meeting was opened with a welcoming address by Dr. Norman S. Grace, chairman of the Ontario Group, who introduced the executive members of the Buffalo Group. John S. Plumb, chairman of the Buffalo Group, in turn introduced the executive members of the Ontario Section.

The technical portion of the program was featured by the presentation of a paper, "The Plasticization of Rubber", by Dr. Arthur Neal, of E. I. du Pont de Nemours & Co., Wilmington, Del. (Dr. Neal's paper is reproduced in full on pages 39-42 in this issue), and two motion pictures entitled, "Robots and Rubber" and "Rubber at the Rouge", which were shown through the courtesy of Farrel-Birmingham Co., Inc., Ansonia, Conn. The films, photographed by Sales Engineer E. J. von der Heide, were introduced and narrated by Andrew Hale, branch manager of Farrel's Akron office who directed the production of both films. The motion pictures, which were the same as those first presented before the April meeting of the Division of Rubber Chemistry in St. Louis, dealt with improvements in rubber processing equipment and modern tire manufacturing methods employed at the Ford plant. An article by Mr. Hale on "Pellet Rubber" appears on pages 35-38.

The Buffalo Group will hold an outing June 14 at a country club in the vicinity of Buffalo, N. Y. Golf and a program of entertainment are being planned. Reservations, which will be required, may be made through the secretary-treasurer, Burt W. Wetherbee, care of Globe Woven Belting Co., Buffalo, N. Y.

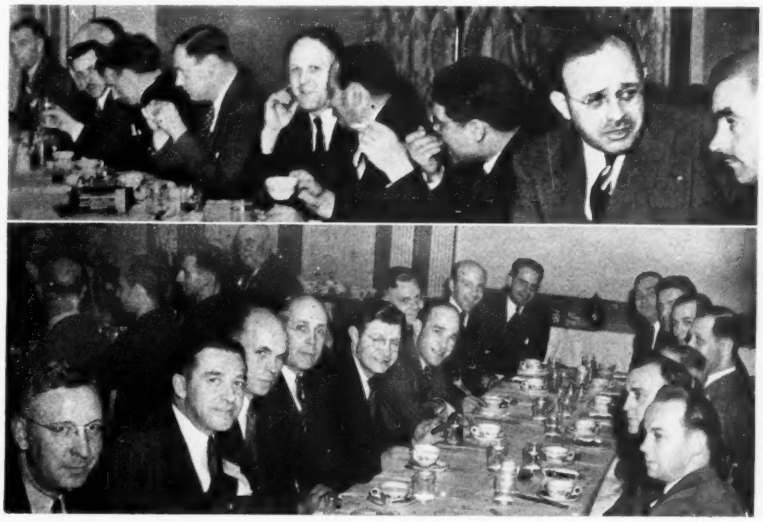
Neoprene and Hycar Discussed Before Chicago Group

SYNTHETIC rubber was the center of interest at a meeting of the Chicago Group, Rubber Division, A. C. S., held at the Congress Hotel, Chicago, Ill., May 2. Over 250 members and guests heard W. L. Semon, of Hydrocarbon Chemical & Rubber Co., talk on "The Development and Properties of Synthetic Rubber" and O. M. Hayden, of E. I. du Pont de Nemours & Co., Inc., speak on "Future Developments in Neoprene." Both papers were well received by the group. Entertainment in the form of "Rubber Magic" was presented by Walter Grote, of the United Carbon Co. At the meeting 18 rubber manufacturers in the Chicago area displayed products of their manufacture.

The group will hold a symposium on plastics at its June 6 meeting at the Congress Hotel. Speakers scheduled are: T. W. Sharp, Carbide & Carbon Chemicals Corp., "Vinylite"; W. F. Cullom Jr., Celluloid Corp., "Cellulose Acetate"; and W. C. Goggin, Dow Chemical Co., "Ethyl Cellulose." At this meeting 44 chemical manufacturers will display new products of interest to the rubber industry. This exhibit will be accessible at four o'clock in the afternoon. Dr. H. A. Winkelmann, Group chairman, is now arranging for a series of interesting programs to be presented through the fall.

Los Angeles Group Holds 70th Regular Meeting

ON MAY 6 the Los Angeles Group, Rubber Division, A. C. S., closed its 1940-1941 season with a supper meeting, the 70th regular meeting of the Group since it was founded. The affair, held at the Mayfair Hotel, los Angeles, Calif., with 95 members and guests present, was sponsored by The B. F. Goodrich Co. and featured an interesting talk on the properties and applications of Koroseal by Harold Brandt, of Goodrich. Ed. Royal (H. M. Royal) and T. Kirk Hill (Kirkhill Rubber) showed colored motion pictures of their recent trip to Mexico City, and a sound and color film on Hawaii was presented by the Matson Navigation Co. to complete the program.



Top Photo by W. Tomlinson; Bottom, Allyn K. Thayer

Dinner Scene at the Joint Buffalo-Ontario Meeting, May 1

W. Shawger (Rubbercraft) won the door prize, an electric razor donated by Goodrich, and the special prize, a portable radio presented by Marshall-Dill Co., went to C. M. Reinke (Reinke, Hillyer, & Amende).

Advance reservations indicate that the sixth annual fishing trip, to be held on June 21 off Catalina Island, will be the most successful ever held by the Group.

Detroit Group Holds Adhesives Symposium

THREE papers and an organized discussion made up an interesting symposium on adhesives at a meeting of the Detroit Rubber and Plastics Group, at the Hotel Whittier, Detroit, Mich., May 9, with 185 members and guests present. The speakers and their subjects were: R. L. Wheeler, Chrysler Motor Corp., "Rubber Adhesives in the Automotive Industry"; S. Adinoff, St. Clair Rubber Co., "Rubber Adhesives in the Automobile Industry"; and T. W. Halloran, Chemical Products, Inc., "Latex Compounding."

A good cement for automotive work, according to Mr. Wheeler, must produce a good bond; be easy to mix and control; be adaptable to production application; be resistant to heat, water, and the weather; and be ready soluble in petroleum solvents. He pointed out that in 1940 the automotive industry consumed approximately 3,250,000 gallons of cement, equivalent to 0.8-gallon per passenger car. At the average coverage of 175 square feet per gallon, approximately 140 square feet of material is held in place by this means. The materials bonded are: trim cloth to metal and to K-board; insulation pads to metal; sponge rubber and solid rubber to metal; and jute to rubber, paper, and metal. Adhesives are also used as a ply-binder, for adhering protective paper to chromed parts, and as a sealer for cracks. The types of cements commonly used are: (1) reclaim, resin, solvent, and drier (40 to 50% solids); (2) gum rubber, resin, and solvent (15% solids); (3) latex (usually compounded); (4) reclaim, rubber, resin, and asphalt as a water dispersion; and (5) reclaim, asphalt, and solvent (as a sealer). A considerable part of the speaker's talk was given over to a discussion of testing adhesives, and a specific method was presented.

According to Mr. Adinoff, rubber cements have been the "neglected child" of rubber literature and rubber technical gatherings. Among the automotive applications cited were: attaching insulation pads to roof, walls, and floors; adhesion of carpets and mats to underlays; in the assembly of arm rests, cowl panels, and window channels; for flocking glove and trunk compartments; and for the assembly of panels and the adhesion of cloth. The speaker held that a good cement should be a little stronger in adhesion than in cohesion, and that cements (non-vulcanizing) made from crude rubber dissolved in naphtha, benzol, and carbon tetrachloride were lacking in adhesive strength, particularly when used with metals and smooth surfaces. Reclaimed rubber cements, however, will bond almost any material to metal with good adherence, according to Mr. Adinoff. Also they can be made highly concentrated, are easily controlled, and a wide variety of resins, asphalts, and reenforcing fillers can be added to them to give a wide range in properties. However, reclaim cements are generally messy to handle, cannot be made in clear color, are basically thermoplastic and thus will soften upon heating.

Those contributing to the discussion were: F. M. McCloud (Ford Motor), E. J. Fickers (Baldwin Rubber), D. Koza (Automotive Rubber) and F. Wehmer (Minnesota Mining & Mfg.). Points brought out included: rubber cements are oversold; most cements are too sensitive for intended use; there is a need of suitable test methods, particularly those which would simulate assembly line and service conditions; specifications should be standardized; a closer cooperation between producer and consumer is needed.

June 20 Date for Akron Outing

THE Akron Group, Rubber Division, A. C. S., has completed plans for its annual summer outing which will be held during the afternoon and evening of Friday, June 20, at the Silver Lake Country Club, Akron, O. The golf course will be open all day, and dinner will be served at 7 p.m. V. K. Hitch, (Akron Chemical) is general outing chairman, and Ed Nahm (Naugatuck) will assist him as vice chairman. Chairmen of the various committees are: T. L. Stevens (C. P. Hall), prize solicitation; C. B. Moore (Philadelphia Rubber) prize award; D. G. Benson (Goodrich), finance; J. B. Waite (Dugan & Campbell), golf; F. A. Bonstedt (Binney & Smith), refreshments; C. F. Marshall (C. F. Marshall), tom foolery; and A. E. Warner (C. P. Hall), publicity.

Fall Division Meeting

THE Division of Rubber Chemistry, A. C. S., will hold its fall meeting on Thursday and Friday, September 11 and 12, at Atlantic City, N. J., with headquarters at the Ritz-Carlton Hotel. The banquet on Thursday evening will be held at the Ambassador Hotel under the guidance of Peter P. Pinto (*Rubber Age*), who has been named chairman of the banquet and entertainment committee. Assisting Mr. Pinto will be S. G. Byam (Du Pont), W. F. Lamela (Okonite), G. J. Wyrough (Whitehead Bros.), Bryant Ross (Vanderbilt), and Arthur Nellen (Lee Tire). Technical sessions will be held in the Atlantic City Auditorium. Both hotels and the auditorium are on the Boardwalk.

Rhode Island Club Plans Outing

THE Rhode Island Rubber Club will hold its summer outing at the Pawtucket Golf Club, Pawtucket, R. I., Friday, June 13. Golf will be the featured activity during the day.

Harry Fisher to Deliver A.S.T.M. Marburg Lecture

HARRY L. FISHER, director of organic research, U. S. Industrial Chemicals, Inc., will present the sixteenth Edgar Marburg Lecture on the subject, "Natural and Synthetic Rubbers", at the forty-fourth annual meeting of the American Society for Testing Materials to be held at The Palmer House, Chicago, Ill., from June 23 to 27, inclusive. The Sixth Exhibit of Testing Apparatus and Related Equipment and the Fourth A.S.T.M. Photographic Exhibit, will be in progress through the week. Committee D-11 on Rubber Products plans an active program including committee reports and technical papers. Methods of testing adhesive tape are to be described, and problems involving power factor and dielectric constant of materials will be covered.

Synthetic Rubber Compounding Ingredient

ADVAGUM, a synthetic product developed specifically for use with synthetic rubber, has been announced by Advance Solvents & Chemical Corp. Advagum, which has only limited utility with natural rubber, is a rubbery solid in slab form, said to be easy to cut and handle. This material cannot be vulcanized and has a mildly pleasant terpene odor, dark amber color, and a specific gravity of 1.1. Advagum is said to be exceedingly resistant to swelling by petroleum and vegetable oils, although it is susceptible to the action of coal tar solvents and alcohols. High resistance to acids and alkalis and low water absorption are also claimed.

Advagum is primarily recommended as a replacement for about 20% of the synthetic rubber contained in normal compounds. The use of such replacements, according to claims, results in greatly improved processing so far as incorporation of fillers, calendering, and tubing are concerned. Tear resistance of the butadiene-type rubbers is said to be improved considerably, and the oil absorption and swelling of compounds containing it is lowered. Another factor of interest is the possibility of extending the current limited supply of synthetic rubbers.

Heliogen Blue BKA

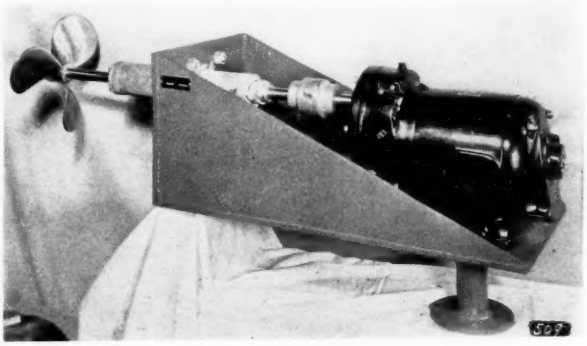
HELIOGEN BLUE BKA powder, an organic pigment for coloring rubber and latex, is announced by General Dyestuff Corp., 435 Hudson St., New York, N. Y. Chemically belonging to the phthalocyanine group, the new coloring agent is said to possess marked tinctorial strength and to produce in medium and light shades brilliant blues of a neutral cast. Rubber colored with Heliogen Blue BKA is said to be fast to vulcanization under all practical conditions. The color does not bleed or migrate in rubber, and it has good fastness to light, according to the manufacturer.

New Machines and Appliances

Side Entrance Mixer

THE Type N side entrance mixer, illustrated, has a front flange which is bolted to a companion flange on the side of a tank with a gasket between. Type N is said to be of interest in the application of propeller-type mixers to large tanks or to tanks where a standard upright mixer cannot be used. In the rubber industry, application includes use for latex and rubber cements.

The bearing is of the lantern type, i.e., it has a long sleeve which is hollowed toward the center to give a bearing at each end. The mixer shaft is connected to the motor through a flexible coupling which takes the load off the motor bearings. The shaft and propeller are of stainless steel, and the bearing is of stainless steel or bronze, depending upon the material to be mixed. International Engineering, Inc.



Type N Tank Mixer

Direct-Set Ratio Controller

THE direct-setting Taylor ratio controller is said to be a highly adaptable, easily convertible instrument for applications where temperature, pressure, rate of flow or liquid level must be controlled in a desired ratio or differential to another related variable. With the new instrument the ratio is changed by a simple screwdriver adjustment directly on a calibrated dial throughout the range of 0:1 to 3:1, direct or inverse. It is not necessary to disturb the processing or to remove the chart plate while making ratio adjustments.

The ratio controller has two measuring systems, one the adjusting system which indicates or records only; and the other, the controlling system, which also may either indicate or record. The adjusting system resets the control point of the controlling system through a linkage arrangement according to a predetermined ratio. The action of the controlling system is the same as the 12OR Series Fulscopes and may be used as a single-duty bi-recording controller when the ratio setting is zero.

Both indicating and recording models of the ratio controller are available with 12OR Series Fulscope features: fixed high sensitivity, adjustable sensitivity, adjustable sensitivity with automatic reset, adjustable sensitivity with Pre-Act, and adjustable sensitivity with automatic reset and Pre-Act. Taylor Instrument Cos., Rochester, N. Y.

Re-Usable Round Charts for Recording Instruments

PERMOCHARTS, made of laminated Vinylite plastic and for use on all types of circular-chart recording instruments, can be constantly re-used by removing each day's ink from the surface with a damp cloth. According to the manufacturer, the charts will not curl, are non-flammable, and are oil, gasoline, and grease resistant. Chart centers are reenforced to prevent deterioration from holding devices. Under normal working conditions each chart is guaranteed for daily use over a period of two years. Where it is necessary to save chart records, a microfilm photographic service is available, which is said to reduce filing space by 98%. Permochart Co.

Cleaning Aluminum Molds

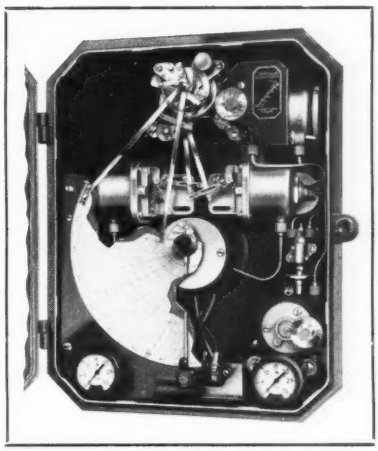
WHEN aluminum molds for vulcanizing rubber become carbonized on the surface, one company has found that the carbon can be removed by dipping into fuming nitric acid, which is reported not to harm the aluminum. Dilute nitric acid, however, should not be used. The concentrated acid should then be washed off quickly with cold water.

Vibration Frequency Meter

WEIGHING only eight ounces and no larger than a slide rule, a new vibration frequency meter will indicate what frequencies between 500 and 20,000 cycles per minute are present in a vibrating body. Although not designed to measure the amount of vibration, it may be used as a rough indicator of the magnitude.

The device employs the vibrating-reed principle and consists of a thin spring steel vibrator, clamped at one end between a set of steel rollers. A knurled knob connected to the rollers permits their rotation and moves the steel reed in or out, changing its frequency of vibration. A sliding pointer on the back end of the steel reed indicates the vibrating frequency which is read off the calibrated scale on the frame of the instrument.

To use the meter, its head is held against the vibrating body, and the adjusting knob is rotated until the vibrator reed moves to and fro at maximum amplitude. If more than one vibrating frequency exists, there will be a point of maximum amplitude for each, and vibrations in different planes may be detected by changing the axis of the meter. Westinghouse Electric & Mfg. Co.



Taylor Direct-Set Ratio Controller

Detecting Vibration Frequencies with Westinghouse Unit

New Goods and Specialties

Polyvinyl Alcohol Hose for Refrigerants

"RESISTOFLEX" PVA refrigerant hose, made from Du Pont's polyvinyl alcohol, provides a flexible hose line between refrigerator compressors and evaporators. As compared to metal hose and tubing, "Resistoflex" PVA hose is said to be superior under conditions where failure may be encountered as a result of vibration and flexing conditions. Also it is lighter in weight and more easily handled than the metal product. According to test data, "Resistoflex" PVA was unaltered after 120 days' immersion in the following refrigerants and solvents: methyl chloride, "Freon-12", methylene chloride, xylene, gasoline, turpentine, carbon tetrachloride, and trichlorethylene. The effect of immersion in mineral lubricating oil for 144 hours at 250° F. was found to be negligible. The hose is made in one-, two-, or three-braid constructions, with a rubber or neoprene cover. Resistoflex Corp.

A New Idea in Room Decoration and Package Sealing

DUTCH BRAND Dec-O-Tape and Figurettes for room decoration and package sealing consist of a bright-colored rubber coating applied to paper, the reverse side of which is treated with a rubber adhesive. The Figurettes are made in a variety of colors and designs —children, animals, fish, boats, fruit, plants, kitchen utensils, Christmas seals, etc. The Dec-O-Tape comes in ¼-, ½-, and one-inch wide rolls, 250 inches long, with the ½-inch width also in 150-inch lengths. Colors include: red, black, silver, green, blue, orchid, yellow, tangerine, chocolate, and white. The new decorative items may be applied to any washable surface without moistening, and they may be removed quickly without marring the surface. Van Cleef Bros.

Motor Toboggan Uses Cleated Rubber Belt

THE Elaison motor toboggan has a framework similar to that of an ordinary toboggan, except that a portion of the bed is an endless fabric-reenforced rubber belt to which steel cross cleats are riveted for the necessary traction. The cleated belt is driven through a three-speed transmission from a 25 h.p. gasoline engine by Link-Belt roller chains. Ordinarily the belt "floats" over snow at the same level as the bottom of the toboggan, but it can be lowered as much as eight inches to improve traction in loose, deep snow or over irregular ground. With three passengers, the vehicle will operate at speeds up to 40 miles an hour and can climb a 35% grade with ease, it is claimed. Troops at Camp McCoy, Wis., training for winter warfare, subjected the toboggan to extensive tests during the past winter. The Four Wheel Drive Auto Co.

Underside of Motor Toboggan, Showing Endless Power-Propelled Traction Belt

Rubber Mesh Speeds Filtering Operations

FILTOMESH consists of a square mesh of rubber, with ¼-inch meshes and reenforced with twisted fiber cords, and is used as a cushion between filter plates and filter medium (cloth, paper, or fiberglas). According to the maker, Filtomesh reduces cleaning operations and costs, speeds filtering, removes an increased percentage of solids, increases cake output, and reduces moisture content in the cake. Filtomesh can also be made in rubber-covered wire cloth for special applications. Paramount Rubber Service, Inc.

Army and Navy Adopt Yachting Shoe

THE Sperry Top-Sider, a safety shoe for use by yachtmen on slippery decks, has been adopted for United States Army and Navy aviators who often must climb on wet wings or fuselages. In addition, the shoes are being used on aircraft carrier decks in the U. S. Navy.

Each sole has 3,700 tiny wave-like squeegees, said to be effective in preventing slippage even when the sole is completely submerged in water. Increased production of the Top-Sider will provide for both military and civilian needs. Sperry Shoe Co.

Sperry Top-Sider

Hot Sand at 900° F. Handled on Rubber Conveyer Belt

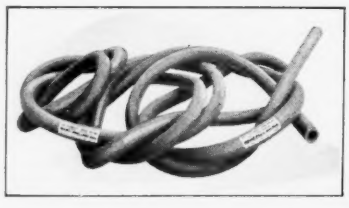
IN A plant of the American Foundry Co., Maltese Cross hot material conveyer belt carries hot sand and spew at temperatures up to 900° F. from a shakeout machine to a Beardsley Piper sand conditioner. The belt, which has been in service for over a year, frequently handles red hot metal and sand, it is reported. Rubber covered, the belt is 24 inches wide, of 28-ounce duck, six-by four-step ply construction, with a $\frac{5}{16}$-inch top cover and $\frac{1}{32}$-inch bottom cover. A ply of asbestos fabric is built-in under the top cover. Hewitt Rubber Corp.

Camelback Features Increased Adhesion

INSTEAD of spraying the entire compound with solvents to obtain adhesion, only a thin layer of tread compound is treated in the manufacture of Super-Mileage camelback. This results in a product in which the penetrating depth of the solvent is controlled and provides a soft, adhesive surface that flows freely into the rasped surface of the tire, leaving the rest of the compound tough and unaffected, it is claimed. To prevent the camelback from adhering to itself in the uncured state and to prevent the application surface from drying out, a varnished cambric-type cloth, Textolin, is used. The B. F. Goodrich Co., Akron, O.

Homo-Flex Hose Line Announced by Manhattan

THE Condor Homo-Flex hose, said to utilize the same principle of balanced construction which was first applied to Homocord conveyer belts, is made in 50-foot lengths on steel mandrels and in several types, including air, water, high-pressure orchard spray, mine spraying, air-oil and oil spray, and steam pressing-iron hose. Among the advantages claimed for the new hose are: extreme flexibility, lightness in weight, ease of handling, inseparable covers and plies, uniform diameters, and less elongation and expansion. The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.

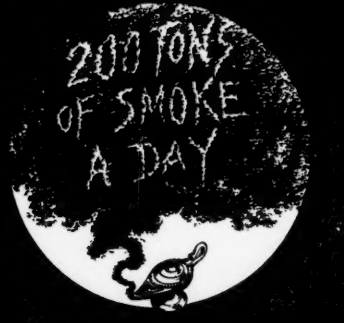


Condor Homo-Flex Hose

TREND

It is a far cry from the days when uncompressed gas black was delivered to consumers in fifty pound barrels to the present day delivery of Micronex Beads in hopper cars of 70,000 pounds.

The efficient transfer of Colloidal Carbon from producer to consumer has been worked out through progressive steps over a period of sixty years. Hopper car delivery conforms to the modern trend in industry of eliminating manual handling wherever possible.



MICRONEX

Beads or Compressed

COLUMBIAN CARBON CO. • BINNEY & SMITH CO.

MANUFACTURER DISTRIBUTOR

PROGRESSION

Seven Steps

to Minimum Handling of Colloidal Carbon

STEP 1.
50 Pound Barrel

This light and bulky packing was originally used because the carbon was of such fluffy character as seriously to limit the methods of delivery.

STEP 2.
75 Pound Barrel

Screw packers were developed which could force 50 per cent more black into the original barrel and accomplished consequent saving of space required.

STEP 3.
12½ Pound Bag

Before packing, the black was agitated in the bin to drive out some of the entrained air, and thus could be packed more compactly in paper bags with an increase in density to 15 pounds per cubic foot.

STEP 4.
Semi Compressed Bag

The cry for "Less Dust" was met by the first attempt at compression. After packing, the bag was pressed slowly into a flat package, thus eliminating some additional air. This medium compressed black increased density to about 20 pounds per cubic foot.

STEP 5.
Heavy Compressed Bag

The medium compressed bag was next subjected to pressure from the other dimension so as to produce a squared package with density of about 25 pounds to the cubic foot. In this form as much as 50,000 pounds could be loaded into a standard freight car, and dusting in the mill room was somewhat further reduced.

STEP 6.
Micronex Beads

Our development of pellet or so-called "Dustless" black brought the first free-flowing material into commercial usage. Density was increased to about 27 pounds per cubic foot. Micronex Beads could be packed in 25 pound bags, thus minimizing handling and storage space, and brought far cleaner conditions in the mill room.

STEP 7.
Hopper Cars

Self-discharging hopper cars, together with automatic plant flow-handling equipment have solved the problem of efficient use of Micronex Beads, and represent the best possible condition of delivery and automatic plant control.

MICRONEX *Beads or Compressed*

COLUMBIAN CARBON CO. • **BINNEY & SMITH CO.**

MANUFACTURER — DISTRIBUTOR

UNITED STATES

EASTERN AND SOUTHERN

Government to Finance Synthetic Rubber Production

Jesse Jones, Federal Loan Administrator, announced on May 16 that Defense Plant Corp., a subsidiary of RFC, has authorized lease agreements with four major rubber manufacturing companies, undertaking the construction and equipping of synthetic rubber plants. These synthetic rubber plants will be built for an initial production of 2,500 tons each a year and can be quickly expanded to a production of 10,000 tons each a year.

The companies involved, Goodyear Tire & Rubber Co., Hydrocarbon Chemical & Rubber Co. (subsidiary of B. F. Goodrich Co. and Phillips Petroleum Co.), Firestone Tire & Rubber Co., and the United States Rubber Co., will operate the plants.

The authorized initial cost of each of the plants will approximate $1,250,000 for land, buildings, and equipment.

After contacting the four rubber companies, we are able to state that all have agreed to build and operate the plants in accordance with Mr. Jones' announcement and that butadiene types of rubber will be produced. The raw materials including butadiene are to be procured elsewhere and are not provided for in this expenditure. General plans are definite, but some details must be formulated in accordance with the existing conditions. It is generally believed that approximately one year will be required before the plants can be in operation, this date to depend very largely upon priorities obtainable for steel and the necessary equipment. Land, buildings, and general facilities for a production of 10,000 tons a year at each plant are to be included in the initial expenditure of $1,250,000, but at this time manufacturing equipment will be provided for only 2,500 tons a year at each of the four plants. The plants are to be constructed, equipped, and operated in production by the individual rubber companies under lease agreements with the Defense Plant Corp.

U. S. Rubber has authorized us to state that its plant will be located on available land near its Naugatuck Chemical Division plant in Naugatuck, Conn., where rubber products have been manufactured for 100 years and where chemicals are being produced for the rubber industry. Plans for the building have been drawn, priorities requested, and construction is to be started as soon as possible.

John W. Thomas, Firestone president, announced that clearing of the ground and test borings would be started on May 22 on an area of ten acres on Wilbeth Road, Akron, which have been set aside for its new plant. Firestone, which since last year has been producing the buna type of synthetic rubber in a smaller plant with a capacity of several tons per day, is already prepared from its own facilities to furnish all utility service such as power, light, steam, and water and expects the plant to be in production in about a year.

Goodyear has advised us that its assignment in the new program will be a production unit similar to its five-ton a day plant recently completed except that the new building, to be 300 feet long by 75 feet wide, will be much larger to take care of 10,000 tons per year. The plant which at this time will be equipped only for 2,500 tons per year will be located across Weston Road directly opposite the newly completed Chemigum plant. Goodyear further states that the proposed plant is to be leased by Goodyear upon an agreement not yet worked out in detail, but which will provide that a portion of the production is to be supplied for Goodyear's own use and the remainder to be apportioned to other rubber companies having no synthetic rubber plant. The plant, which is expected to employ more than 100 men, will be of brick and steel, two stories and one-story style construction on a nine-acre site of land on the B. & O. Railroad. Electrical services will be supplied by Ohio Edison, and other facilities will be provided by Goodyear.

At the time of going to press no official statement could be obtained from Hydrocarbon Chemical & Rubber Co. or the B. F. Goodrich Co. as to their plans. However announcement appears on page 64 of this issue of a recent increase in the capacity of the Ameripol plant which has been in operation for several months.

Aside from the present government program, which will probably not be effective for approximately one year, the privately financed production by six producing companies is now at the rate of over 1,100 short tons a month or approximately 14,000 tons a year. Also, projected plans for privately financed plants, are expected to increase that capacity to a total one year from now of 2,500 tons a month or 30,000 tons a year, which together with present government plans will provide for total United States production of synthetic rubber as of June 1, 1942, at the rate of approximately 40,000 tons per year.

The National Association of Independent Tire Dealers has moved from 250 W. 57th St., New York, N. Y., to 30 N. LaSalle St., Chicago, Ill. The new executive director is C. C. Simpson.

CALENDAR

June 1-6.	SAE. Summer Meeting. The Greenbrier, White Sulphur Springs, W. Va.
June 6.	Chicago Rubber Group. Congress Hall.
June 6.	New York Rubber Group. Annual Outing. North Jersey Country Club, Preakness, N. J.
June 13.	Rhode Island Rubber Club. Annual Outing. Pawtucket Golf Club, Pawtucket, R. I.
June 14.	Buffalo Rubber Group. Annual Outing.
June 16-20.	A.S.M.E. Semi-Annual Meeting. Kansas City, Mo.
June 19-21.	Wilbur D. Bancroft Colloid Symposium. Cornell University, Ithaca, N. Y.
June 20.	Akron Rubber Group. Annual Outing. Silver Lake Country Club, Akron, O.
June 21.	Los Angeles Rubber Group. Sixth Annual Fishing Trip.
June 23-27.	A.S.T.M. Annual Meeting, Palmer House, Chicago.
Sept. 8-12.	A.C.S. 102nd Meeting. Atlantic City, N. J.
Sept. 25-26.	S.A.E. National Tractor Meeting. Schroeder Hotel, Milwaukee, Wis.

U. S.-Haiti Agreement

The governments of the United States and Haiti on May 5 concluded an agreement providing for the expansion of numerous crops, including rubber, in the latter country. The United States Department of Agriculture, in conjunction with the recently concluded survey regarding the possibilities of rubber growing in Latin America, already has established experimental stations and a nursery for the propagation of rubber on the island republic, and results have been so successful that the planting of extensive areas of rubber trees is now planned. The United States also will offer technical information and assistance.

A further extension up to an additional $500,000 in credits under a contract made in 1938 by the Export-Import Bank and the J. G. White Engineering Corp. will be granted the Haitian Government. The money will be spent to complete highway and irrigation projects now under way and to provide transportation facilities for the areas to be devoted to rubber.

The United States Treasury Department. Washington, D. C., has instructed collectors to impose a 25% duty on drums with removable heads when imported filled with latex, for such containers when emptied, enter the commerce of the country in competition with domestic drums. Latex drums without removable heads are usually destroyed during or after emptying, consequently are duty-free as one-time containers.

Certificates of Necessity Issued

Office of Government Reports, Washington, D. C., (in collaboration with the National Defense Advisory Commission) included in its recent listings of Certificates of Necessity for plant expansion the following: American Zinc Co. of Illinois, St. Louis, Mo., facilities for slab zinc and calcined raw zinc concentrates, at an estimated cost of $253,000; Anaconda Wire & Cable Co., New York, N. Y., asbestos shipboard cable, $13,000, cable and field telephone wire, $146,000; Barrett Co., New York, transportation of anhydrous ammonia, $173,000; Bay State Abrasive Products Co., Westboro, Mass., grinding wheels and other abrasive products, $60,000; Godfrey L. Cabot, Inc., Boston, Mass., transportation and delivery of natural gas, $83,650; Cambridge Instrument Co., Inc., Ossining, N. Y., aircraft precision instruments, gas analyzers, and indicators, $85,000; Continental Rubber Works, Erie, Pa., rubber goods (molds), $41,000; E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., neoprene, $7,500,000; Firestone Tire & Rubber Co., Akron, O., bullet-proof airplane gas-tank lining, $100,000, metallic machine-gun belt links, $417,000; General Cable Corp., New York, rubber insulated electric wire and cable, $486,000; General Tire & Rubber Co., Akron, barrage balloons, $70,000; Goodyear Tire & Rubber Co., Akron, shoe tracks for tanks, tractor band tires, and rubberized fabrics, $239,000, synthetic and natural rubber, rubber blocks, truck tires and tubes, $730,000; Hodgman Rubber Co., Framingham, Mass., rubber products, $115,000; Locke Machine Co., Cleveland, O., machining forged guides and plates for rubber tracks, $7,000; Norton Co., Worcester, Mass., abrasive products and machine tools, $162,000, machine tools and fused aluminum oxide, $284,000; Taylor Instrument Cos., Rochester, N. Y., precision instruments, $129,000; Union Asbestos & Rubber Co., Cicero, Ill., asbestos pipe covering and insulator, $208,000; United States Rubber Co., New York, gas mask tubes, track block equipment for tanks and plant protection, $105,000, plant protection and rubber products, $5,000, raincoats, bullet-sealing fuel tanks, tube equipment, and synthetic rubber, $356,000.

Certificates enable manufacturers to avail themselves of the 60-month tax amortization plan. Certification, however, does not mean that such expansion will necessarily occur.

New York Belting & Packing Co., One Market St., Passaic, N. J., owing to the scarcity and high cost of walrus hide due to present world conditions, has developed a new covering for cotton gin rollers. Known as No. 40 Spider Gin Roll Covering, it is composed of cotton fabric and rubber, and is provided in strips 12½ feet long and ¾- by ¾-inch. A recent bulletin of the United States Department of Agriculture finds the substitute superior in capacity and durability to the previously used walrus hide, and cheaper and easier to obtain.

Department of Commerce Changes

To provide greater service to government and business the Bureau of Foreign and Domestic Commerce of the United States Department of Commerce, Washington, D. C., recently was drastically reorganized, as outlined by the Bureau's Director, Carroll L. Wilson. More than 30 divisions have been condensed into five major organizations to simplify executive direction and intensify the Bureau's effort in gathering, analyzing, interpreting, and disseminating facts about national and international economy necessary for informed decisions in industry and government on commercial and economic matters. The five divisions follow: The Division of Research and Statistics will study and analyze the economic life of the nation as a basis for the general aims and objectives of all Bureau activities.

The Division of Regional Economy will direct continuous contact with the nation's principal economic areas through a field force operating from strategically located offices and through cooperative research stations.

The Division of International Economy will provide government, exporters, and importers with information on foreign economic and commercial affairs and on foreign national policies affecting commerce.

The Division of Commercial and Economic Information will edit, publish, and distribute to government and business information developed by the various divisions of the Bureau.

The Division of Industrial Economy will establish means and methods for conducting economic and statistical studies along lines of practical reality, making each important industry's experiences available to all industries and to the government.

Everett G. Holt, formerly chief of the Leather & Rubber Division, is now chief of the Consumption Materials Unit of the Division of Industrial Economy. It is understood that this unit still has jurisdiction over leather and rubber work carried on in the Bureau as well as several additional commodities.

O. P. M. Cuts Auto Output

The Office of Production Management, Washington, D. C., in an effort to conserve strategic materials and release labor needed elsewhere last month notified automobile manufacturers of their individual allotments of motor vehicles to be produced from August 1, 1941, to July 31, 1942, whereby output will be cut 20.15%, from 5,289,972 to 4,224,152 units. Companies producing less than 2,000 units were not curtailed, but medium-sized producers of passenger cars were reduced about 15%, and the larger concerns 21.5%; while companies manufacturing trucks exclusively were curtailed 5 to 10%, depending upon the volume of their business. Due regard was given to the necessity of maintaining the relative position of the different companies in the industry, their size, and field organization employment.

Sponsoring Outside Research

A recently compiled list by the National Research Council, Washington, D. C., reveals that 210 organizations in this country are furthering research by awarding more than 721 scholarships, fellowships, and grants. Included are:

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., 20 post-graduate fellowships in organic chemistry, $750 each; six post-doctorate fellowships in organic chemistry, $2,000 each plus additional $1,000 for extraordinary equipment.

Firestone Tire & Rubber Co., and Firestone Plantations Co., both of Akron, O., one fellowship for research on rubber chemistry, $1,000; one fellowship, research on plant pathology, $1,000; and one research associate at the National Bureau of Standards, working on ignition research.

Goodyear Tire & Rubber Co., Akron, one fellowship, research on rubber or rubber chemicals, $1,000.

Hercules Powder Co., Wilmington, three fellowships, paper chemistry, $500 each; one fellowship, research on insecticides, $1,500; one grant toward a group project on the development of determining the hand and feel of fabrics; one grant toward a project or warp sizing of spun rayon.

Midwest Rubber Reclaiming Co., East St. Louis, Mo., for a five-year investigation of the whole reclaiming process, including natural and synthetic rubbers.

Monsanto Chemical Co., St. Louis, Mo., 11 fellowships, from $350 to $10,000 each.

National Lead Co., South Amboy, N. J., one fellowship, research in the chemistry of titanium, $1,500 a year for two years.

New Jersey Zinc Co., New York, N. Y., two scholarships, total endowment of $15,000 each.

Sun Oil Co., Marcus Hook, Pa., six fellowships.

Timken Roller Bearing Co., Canton, O., one grant, investigation of surface films on steel, $6,000; one grant, development of steels for high temperature service, $10,000.

Molded Latex Products, Inc., Fourth and Virginia Sts., Passaic, N. J., with about 60 employes, manufactures toys and bulbs under the Kaysam process. The company, on December 23, 1940, received a license under all of the patents owned by the Kaysam Corp. of America, one E. 57th St., New York, N. Y., on which date Molded Latex Products also assumed the obligations of Kaysam on its lease of manufacturing space and likewise purchased all the manufacturing assets of Kaysam. Officers of the Passaic company are: Allan A. Ryan, Jr., president; John A. Hagen, vice president; Fortune P. Ryan, treasurer; Adolphus F. Long, secretary; Laurence T. Prendergast, chief chemist; and Edmund L. Gregor, sales manager. The Kaysam corporation is no longer engaged in manufacturing, but simply acts as licensor of the Kaysam and other patents which the company owns or controls.

U. S. Rubber Personnel Notes

United States Rubber Co., 1230 Sixth Ave., New York, N. Y., on May 16 made Edward H. Marsh, Jr., assistant general manager of three of its principal operating divisions: General Products, "Lastex" Yarn and Rubber Thread, and Mechanical Goods. Previously Mr. Marsh had been directing the company's foreign relations and export activities.

Harry W. Brown has been made manager of the cycle tire department. Mr. Brown recently served as assistant manager and previously had been sales manager of bicycle tires for the Fisk Tire Co., purchased by U. S. Rubber in January, 1940.

Mrs. Selma M. Tompkins, 48, wife of L. D. Tompkins, U. S. Rubber vice president, died on May 12 at their home in Milton, Conn., after a long illness. She also leaves a son and a daughter.

U. S. Rubber on May 6 announced a plan for payroll savings for its 42,000 employes in the United States in support of the government's Defense Savings Bonds campaign. Under the plan employes voluntarily will authorize the company to deduct a stated weekly or monthly sum from their earnings for purchase of a $1,000, $500, $100, $50, or $25 bond. The company will accumulate each employe's savings to the amount of the chosen bond's purchase price and will then make the purchase for direct delivery to the employe.

To Broaden Manufacturing Activities

Demands of the national defense program and the widening scope of the kinds of military and naval goods it is being asked to produce for the government, have impelled U. S. Rubber to call a special stockholders' meeting for July 8 in Jersey City, N. J., to vote an amendment widening the present charter of the company. The stockholders by letter have been informed that it would also be desirable for a complete, modern re-statement of the objects and charter powers of the company since these had not been changed since the company's incorporation in March, 1892.

"It is expected that the Government of the United States may soon call upon the company to engage in activities important to the national defense—possibly including the making of munitions—some of which the company is not now authorized by its charter to conduct," a proxy statement mailed to stockholders May 23 explained.

Intercontinental Rubber Co., 745 Fifth Ave., New York, N. Y., at board meetings on May 5 elected C. L. Baker president and a director of Intercontinental as well as of its three subsidiaries, Continental-Mexican Rubber Co., Continental Rubber Co. of New York, and Rubber Surfacers, Inc., to succeed the late George H. Carnahan. Mr. Baker for a number of years was in charge of all the smelting properties in Mexico of the American Smelting & Refining Co. H. G. Atwater will continue as vice president of all four companies.

Photo by Bachrach

Paul R. Mc Campbell

Mc Campbell Kleinert Director

Paul R. Mc Campbell, manager of the factory in College Point, L. I., of I. B. Kleinert Rubber Co., was elected director at the annual stockholders' meeting in the New York, N. Y., office, at 485 Fifth Ave. on May 20. After graduating from Wabash College in 1917 with a Chemical Engineer's degree, Mr. Mc Campbell entered First Officers Training Camp, departing for France in August as a first lieutenant. He was attached to the 26th Yankee Division during the war and was discharged in 1919 with rank of captain.

He started his business career as assistant chemist for the G. & J. Tire Co., a division of the United States Rubber Co. in Indianapolis, Ind. Soon he was placed in the development department and remained there until 1923, when he joined the engineering department of the Hunter Dry Kiln Co., specializing in the drying of rubber. In September, 1924, Mr. Mc Campbell was employed by Kleinert as assistant chemist at the College Point laboratories, where he has remained until now. He rose rapidly to the managership of the entire factory and still holds that position in addition to his newly acquired duties as a member of the board.

Charles E. Stokes, Jr., vice president of the Home Rubber Co., Trenton, N. J., was elected chairman of the budget committee of the Trenton Community Chest.

Society of Automotive Engineers, Inc., 29 W. 39th St., New York, N. Y., will hold its summer meeting at The Greenbrier, White Sulphur Springs, W. Va., June 1 to 6. Scheduled for the morning of June 4 are papers on "The Rolling Resistance of Pneumatic Tires as a Factor in Car Economy" by W. F. Billingsley, of The B. F. Goodrich Co.; R. D. Evans, Goodyear Tire & Rubber Co.; W. H. Hulswit, United States Rubber Co.; and E. A. Roberts, Firestone Tire & Rubber Co.

New Neoprene Plant

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., according to President W. S. Carpenter, Jr., will immediately start construction of a new plant for the production of neoprene at Louisville, Ky. This new plant, which will be financed, built, and operated by the du Pont company, will have a capacity of 10,000 long tons per year and will be additional to the plant at Deepwater, N. J. The du Pont plant now operating at Deepwater has an annual capacity of 6,000 long tons, but with additional facilities under construction this figure will be raised to 9,000 tons before the end of this year. The total present and projected capacity of 19,000 long tons per year is intended to be adequate for expected defense and commercial needs including a substantial tonnage for the manufacture of certain types of heavy duty tires.

Mr. Carpenter stated that tires made with a neoprene tread have proved equal to natural rubber tires under all conditions of service, and tests have shown them superior under the severe service conditions undergone sometimes by truck tires. However tires are not being made from neoprene today as the present supply has been allocated for defense needs, but with the Louisville plant in operation sufficient supplies should be available for additional commercial uses. Although the cost of neoprene will probably never be so low as that of natural rubber, economies resulting from the larger scale of production will reduce the price so that tires with neoprene treads can be used where operating conditions are such that neoprene will give the tires longer life.

Muller Retires

J. Valentine Muller, after 46 years with the R. & H. chemicals department of the du Pont company, retired last month under the company's new pension plan and was honored at a dinner by thirty of his associates on April 29. Mr. Muller was superintendent of the R. & H. New York warehouses and before du Pont took over Roessler & Hasslacher had been traffic manager there.

The F. J. Stokes Machine Co., Philadelphia, Pa., recently completed at its Tabor Rd. plant an addition providing more than 50% additional floor space and the needed facilities for a correspondingly increased output of completely automatic molding machines and other equipment for the plastics industry. Many new machine tools and a new boiler plant have been installed; the tool room has been enlarged and equipped with the latest machines; a greatly expanded punch and die department has been set up as a separate manufacturing division; and much additional space was created for office and engineering staffs. The Stokes company is operating 20 hours a day, six days a week, and with its new facilities is expected to produce more than double its last year's output of molding and preforming presses.

Pittsburgh Plate Glass Co., Columbia Chemical Division, 30 Rockefeller Plaza, New York, N. Y., according to W. I. Galliher, director of sales, has named as manager of the technical service department Dr. G. L. Cunningham, who joined the company last September after having been a research chemist at Mathieson Alkali Works since 1930.

New Jersey rubber manufacturers in general are operating with two or more shifts, with plenty of orders on hand. The Jos. Stokes and Luzerne Rubber companies, of Trenton, and Vulcanized Rubber Co., Morrisville, Pa., have increased hard rubber production. Essex Rubber Co., Trenton, operating to capacity, expects a good summer season; while Morrison Rubber Co., Trenton, reports increased output in belting, hose, and packing.

The Thermoid Co., Trenton, N. J., has reported that sales in April for itself and its domestic subsidiaries totaled $1,054,699, a record high which compares with $696,659 for April, 1940. Sales for the first four months of the current year reached $3,641,891, against $2,736,487 in the corresponding period of 1940. The company is having plans drawn for a one- and two-story factory addition to its plant on Whitehead Rd. The building, of brick and steel, 212 feet in length and 111 feet wide, will cost $50,000. Thermoid is operating to capacity in all departments.

The American Chemical Society has awarded the Priestly Medal to Thomas Midgley, Jr., chairman of the A. C. S. board of directors and vice president of the Ethyl Gasoline Corp., 405 Lexington Ave., New York, N. Y.

Jacobus F. Frank has changed his address from 132 Front St. to 120 Wall St., New York, N. Y. Mr. Frank is representative in the United States for the Netherlands Indies Government Estates.

O. W. Van Petten, of Columbian Carbon Co., Charleston, W. Va., has been elected 1941-42 chairman of the Eastern District of the American Petroleum Institute's Division of Production and is also a member of the advisory committee.

The Barrett Co., 40 Rector St., New York, N. Y., last month announced the acquisition of additional land adjacent its Frankford, Pa., plant for expansion of its coal tar chemical manufacturing activities and also plans to more than double its present facilities for producing phthalic anhydride.

Precision Roll & Rubber Co., Yardville, N. J., is running 24 hours a day turning out products for the textile and the leather industries. Officials report many orders on hand.

Bevis Longstreth, president of Thiokol Corp., Trenton, N. J., has returned from a business trip to the West.

Jones's Report on Rubber Buying

Jesse Jones, Federal Loan Administrator, in a letter (May 9, 1941) to the President of the United States and its Congress reporting upon the activities of the Reconstruction Finance Corp. and affiliates in connection with the national defense program, included a statement regarding the Rubber Reserve Co., of which H. J. Klossner, a director of the RFC, is president, and which was created June 28, 1940. Five million dollars was subscribed to its capital stock, and the RFC is committed to the Rubber Reserve Co. to the amount of $200,752,000 of which $190,000,000 is allotted to buy up to 430,000 long tons of rubber from the Far East (which would result in an average cost of 19.726¢ per pound). The remaining $10,752,000 is intended for the fulfillment of an agreement by the Rubber Reserve Co. to purchase up to 24,000 long tons of Brazilian rubber (a maximum average cost of 20¢ per pound). On April 30, 1941, 97,947 tons had been delivered; 13,710 tons were in transit; and 37,533 tons await shipment. The balance of the Far Eastern rubber should be accumulated this year.

In order not to interfere with the requirements of the rubber industry the Rubber Reserve Co. is buying in cooperation with the industry at about 20¢ a pound. Meanwhile the industry has agreed not to carry less than 150,000 tons to meet current needs. But as of March 31, 1941, the industry stocks were 210,000 long tons.

Max Durst, president of the Keystone Brass & Rubber Co., Inc., Philadelphia, Pa., recently returned from a 20,000 mile trip throughout South America, where the loss of European markets due to the war has made conditions deplorable. Many nations which depended upon exports of raw materials for a livelihood now must create new home industries. In consequence high tariffs have been imposed on imports of finished goods, but low wages are a deterrent to greater sales because of low consumer purchasing power. Among other impressions gathered by Mr. Durst are: (1) South Americans think and act more like Europeans than Americans; (2) Most people are pro-English and pro-American; (3) An attempt to modernize the highways is being made, and some residential building is going on; (4) The west coast has not progressed so rapidly as the east; (5) Except in Peru, most countries do not allow the removal of American money without special permission; (6) The future of South America as a market for American products depends on the establishment of native factories and resultant higher wages and purchasing power.

Dr. A. A. Somerville, who has been confined to the hospital for about three weeks with pneumonia, is now recuperating at his country home in Carmel, N. Y., and is expected to be active again in a few weeks. Dr. Somerville is vice president of R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y.

Givaudan-Delawanna, Inc., 330 W. 42nd St., New York, N. Y., recently revealed that the results of a questionnaire, sent to manufacturers of rubber goods classed as sundries and wearing apparel makers, to department store buyers throughout the nation, and to an average cross-section of women, indicated that 55% of the women shoppers favored antiseptic rubber goods.

The Chemists' Club, 52 E. 41st St., New York, N. Y., on May 7 held its annual meeting at which Walter S. Landis, vice president, American Cyanamid Co., was elected president. Among the vice presidents chosen were: resident (reelected), Ralph E. Dorland, of the Dow Chemical Co.; and, suburban, Per K. Frolich, of the Standard Oil Development Co.

Whitehead Bros. Rubber Co., Trenton, N. J., is erecting a new factory addition 50 by 100 feet to take care of additional business. The company reports increased orders.

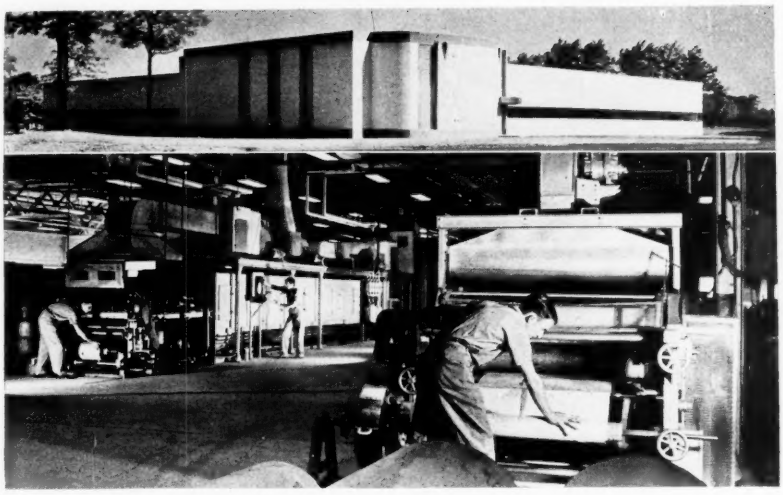
John M. Ball, editor of *The Vanderbilt News*, who last month completed two decades with R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y., this month celebrates his silver jubilee in the rubber industry, having joined the Manhattan Rubber Mfg. Co., Passaic, N. J., in 1916.

The Rubber Manufacturers Association, Inc., 444 Madison Ave., New York, N. Y., is sending to tire dealers throughout the nation a display chart prepared by its Tire Division emphasizing that "new tires need new tubes" and that an old tube is not only unsafe, but false economy.

Raybestos-Manhattan, Inc., Passaic, N. J., on May 10 held dedication exercises of the memorial to Col. Arthur F. Townsend, co-founder and president for 26 years of The Manhattan Rubber Mfg. Co. and chairman of the board following its merger with the Raybestos company in 1929, a position he held until his death on January 14, 1940. Attending the ceremony were Mrs. Townsend, her son, a niece of the late colonel, who unveiled the monument, other special guests, officers and directors of the company, and most of Manhattan's 3,600 employes in Passaic. The memorial was a gift of the Townsend Memorial Association, organized last fall among the company's workers to pay tribute to Colonel Townsend. Grannell E. Knox, the firm's New Jersey sales manager, was general chairman of the memorial committee.

Mrs. Margaret Stewart Green, 54, widow of Henderson M. Green, vice president and director of Raybestos-Manhattan, passed away in Richmond, Va., May 12.

Youngs Rubber Corp. of New Jersey, Trenton, N. J., has let a contract for a one-story factory addition to cost $5,000. President Arthur M. Youngs and his wife have been visiting at Fort Knox.



New Plant of the Industrial Tape Corp. *(Top)* and Production Lines in the New Building *(Bottom)*

Industrial Tape Corp. Opens New Plant

On May 16 the Industrial Tape Corp., New Brunswick, N. J., (a subsidiary of Johnson & Johnson), formally opened its very modern plant located just outside of New Brunswick in an expansive new development which provides a rural environment for those at work and completely eliminates conditions prevalent in crowded urban locations. The one-story building 204 by 178 feet, with a mezzanine floor 49 by 71 feet and providing 58,456 square feet of floor area, is constructed with 14-foot ceilings and column centers 38 by 35 feet. It is equipped with fluorescent lighting and has sound and heat insulation.

Starting from orders placed by a Detroit drug store in 1928 for surgical adhesive tape, which, as later learned, was being used for masking automobile bodies during spray painting, this business has grown so that now the company's products include cloth-backed and paper-backed tapes, cellophane tapes, and specialty tapes for many varied uses. The adhesives containing rubber are applied in a continuous unit consisting of the roller spreading mechanism, a long enclosed drying chamber with controlled facilities for solvent recovery and the take-off.

Pennsylvania Rubber Co., Jeannette, Pa., through L. J. Waldron, general sales manager, last month announced three new appointments. Herbert Wolfe, formerly connected with the Pittsburgh, Pa., office of the Firestone Tire & Rubber Co., has been made manager of Pennsylvania's Chicago, Ill., district. Made manager of the New York, N. Y., district is C. E. Steele, previously associated with Firestone, Fisk Rubber Corp., and the United States Rubber Co. W. H. Skinner, formerly purchasing agent for the State Highway Commission of the State of Indiana, is now serving as branch manager at Indianapolis for Pennsylvania Rubber Co.

Export Control Expanded

President Roosevelt and the State Department have added the following to the fast growing list of products subject to license export control: litharge; piping, rubber tire forming, if straight, even though measured, cut, and threaded; stearic acid; stearine pitch base (electric cable finish compound).

Exporters must give the following additional information on license applications: (1) the quantity, in pounds, of rubber in unused rubber tires and tubes; (2) the quantity of carbon black, in pounds, in unused rubber tires and tubes.

The State Department's export control administration has revoked all licenses for the shipment of scrap rubber to Japan and occupied parts of China.

Crescent Insulated Wire & Cable Co., Trenton, N. J., continues operating 24 hours a day. Vice President C. Edward Murray, Jr., was on a business trip to Washington, D. C.

A. G. Spalding & Bros., manufacturer of athletic goods, 19 Beekman St., New York, N. Y., according to Advertising Manager J. C. Gibbons, has sold its plant at Chicago, Ill., and is centralizing its manufacturing in Massachusetts, with one factory in Brattleboro, Vt.

New Peptizing Agent, RPA No. 4

The peptizing agent RPA No. 4, chemically a mixture of aryl mercaptans standardized as 50% alpha naphthyl mercaptan, is designed to plasticize crude rubber, to improve processing, and reduce the viscosity of rubber cements. The new agent is two and one-half times as active as either RPA No. 2 or No. 3 and may be substituted for these materials in all cases, according to the manufacturer, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

RPA No. 4 is a light amber liquid with a specific gravity of 1.20. It has no effect on aging, tensile strength, hardness, and tear resistance; it will not stain and does not impart odor to the vulcanized compound, it is claimed. Sulphur greatly retards the peptizing action of RPA No. 4, and channel black and zinc oxide also retard to a lesser extent. Such materials should be withheld until the desired degree of plasticity has been obtained.

On a mill or in a Banbury, 0.1 to 0.2% RPA No. 4 is recommended, but in a Gordon plasticator the amount is 0.02%. When breaking down rubber in a Banbury, little or no cooling water should be used, and in some cases it is desirable to elevate the temperature by the use of steam on the shell. The peptizing agent should be added with the rubber, between two portions of the charge or by means of a mechanical injector in the side of the Banbury. On a mill RPA is added as soon as the rubber takes to the rolls, which should be heated to about 225° F. A dropper feed is desirable in the case of a plasticator, with the RPA dropping directly on to the rubber as it is fed into the hopper or on to the rubber at the rear end of the barrel.

John A. Roebling's Sons Co., Trenton, N. J., through Charles G. Williams, executive vice president and general manager, has announced the appointment of Robert T. Bowman as director of public relations, under the general direction of the Roebling's Sales Division, of which Ernest C. Low is general manager. Mr. Bowman for the past three years was president of the New Jersey State Chamber of Commerce.

Mrs. Richard McCall Cadwalader, 60, the former Emily Margaret Roebling, granddaughter of the late John A. Roebling, died suddenly in Fort Washington, Pa., on May 15.

U. S. Crude and Waste Rubber Imports for 1941*

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Totals 1941	Totals 1940	Balata	Miscellaneous	Waste
Jan. .....*tons*	82 095	3,046	646	655	99	292	86,833	72,520	73	870	85
Feb.	70,335	1,968	656	535	170	309	73,973	43,088	82	709	66
Mar.	83,835	1,725	371	670	90	432	87,123	59,277	85	1,012	38
Apr.	61,403	1,166	117	205	44	370	63,305	70,700	66	799	14
Total 4 mos., 1941.....*tons*	297,668	7,905	1,790	2,065	403	1,403	311,234	.....	306	3,390	203
Total 4 mos., 1940.....*tons*	231,910	10,165	1,452	760	158	1,140	.....	245,585	334	2,204	309

**Compiled from The Rubber Manufacturers Association, Inc., statistics.*

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Firestone Financing

Firestone Tire & Rubber Co., Akron, has registered with the Securities and Exchange Commission at Cleveland an issue of $50,000,000 20-year 3% debenture bonds due May 1, 1961. Principal underwriters were Harriman Ripley & Co., Inc., and Otis & Co. From the proceeds of the sale Firestone will apply $45,938,000 to the redemption about July 1, 1941, at 103% of all of the $44,600,000 principal amount of its 10-year 3½% debentures; while the balance will be added to cash funds and utilized in the ordinary course of business of Firestone and its subsidiaries. A fixed minimum sinking fund will be established to retire, by next May and semi-annually thereafter, $625,000 principal amount of debentures, or at the rate of $1,250,000 a year. The indenture also calls for an additional earnings sinking fund to retire, by May 1, 1942, and by each May 1 thereafter, either $750,000 principal amount of debentures or such lesser amount as may be retired through the application of a sum equivalent to 10% of the consolidated net income for the preceding fiscal year. To the extent that retirements through the additional earnings sinking fund are less than $750,000 in any year the amounts are to accumulate and be payable in subsequent years.

To Build Gun Mounts

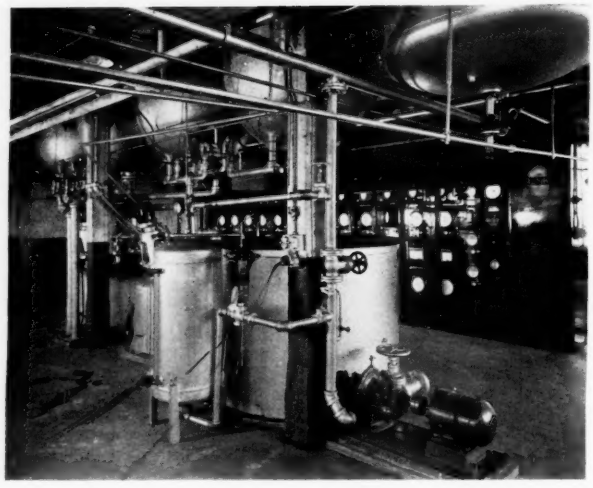
Firestone, in making available its extensive machine shop facilities for national defense, has begun work on a $10,000,000 contract for mounts and carriages for the Swedish Bofors anti-aircraft gun for the United States Army. Although manufacture of the guns will be centered elsewhere, it is expected they will be shipped to Akron to be assembled as the mounts and carriages roll off the Firestone production line.

To speed up production two new plants are being built to give 230,000 additional square feet of floor space, and Firestone will hire 1,000 more workers to turn out the 1,500 parts necessary for construction of each assembly, in addition to the gun itself. It is estimated that by the year-end more than $1,000,000 will have been spent for the construction, tooling, and equipment necessary for the work.

Already Firestone has organized classes for training employes to operate the machinery for this job. The classes have been established in cooperation with the national defense program for vocational training conducted by the local board of education in conjunction with the U. S. Bureau of Education.

Firestone, Jr., Named Drive Chairman

Vice President Harvey S. Firestone, Jr., has been appointed state chairman in charge of the United Service Organizations for National Defense drive in Ohio for $801,950 of the $10,765,000 national goal to operate more than 360 service clubs for soldiers, sailors, and defense workers.



Control Panel and Mixing Vats in New Ameripol Plant of Hydrocarbon Chemical & Rubber Co. at The B. F. Goodrich Co. Mill No. 3, Akron

Ameripol Output to Be Doubled

John L. Collyer, president of The B. F. Goodrich Co., Akron, in an interview over the Columbia Broadcasting System on May 15 revealed that production of Ameripol, the company's synthetic rubber, is being increased from 2,500 to 5,000 tons a year as the result of a program for expanding facilities at the Ameripol plant. Such a move is necessary to meet the increasing demand for crude and synthetic rubber resulting from the national defense program.

Ameripol already has found popular approval in passenger car and light truck tires and is also being used in deicers and bullet-sealing gasoline tanks.

Trademark Revised

Trademark of the Goodrich company, long familiar as a "G" partially enclosed by a wreath and flanked by two diamonds, has been changed to a wreath enclosing the initials "B.F.G." and the date of the company's birth, 1870. It will be used on the company's products, advertising, and other identification.

New Gasket Company

J. H. Connors, vice president in charge of sales of the mechanical division at Goodrich, recently announced that the newly formed Flexrock Corp., 411 E. Market St., Akron, has been granted the exclusive distributorship for the patented Flexrock rubber gasket made by the company. General sales engineering manager of the new organization is the inventor of the gasket, T. D. Nathan, who has been engaged in sales engineering for Goodrich in connection with the product since 1934. Flexrock Corp. will be assisted by the research and development staffs of the Goodrich company.

The gasket, manufactured for sizes ranging from 3/4- to 108-inch pipe, can be applied to pipe of any composition and is so designed that pipe couplings can be assembled easily in the field and at the same time provide a seal that is not disturbed by any new conditions on the pipe. Like a rubber band, the gasket is laid over the lip end of the pipe and is provided with circumferential ribs that fold into place when the next section of the pipe is forced over them, locking the two lengths securely together. These ribs are said to resist pressure thrusts and soil stresses from any angle. The gasket is produced in either natural or synthetic rubber; the latter has special application on oil lines.

The gasket is likewise designed for either light duty or pressure couplings. The former are used mostly in irrigation piping, sanitary and sewer lines, and low-pressure water lines; while the latter have been utilized in municipal and industrial water systems, oil gathering or transmission pipe lines, and for miscellaneous pressure services.

Goodrich Notes

F. A. Lang, operating manager of Goodrich's mechanical division, now heads rubber heel and sole sales, formerly in charge of M. D. Maskrey, resigned, according to W. S. Richardson, general sales manager of the division.

With aviation production mounting, Army Air Corps transport planes are rushing bullet-sealing gasoline tanks for combat aircraft from the Goodrich plant in Akron to busy West Coast factories.

Howard I. Cramer, since 1933, professor of rubber chemistry at the University of Akron, leaves that post August 1 to enter the research and development department of Sharples Chemicals, Inc., Philadelphia, Pa., previously called the Sharples Solvents Corp. Dr. Cramer for several years had been a rubber chemist at the Goodyear Tire & Rubber Co. and now is also secretary of the Division of Rubber Chemistry, A. C. S.

Oak Rubber Co., Ravenna, O., has named James B. Mullen assistant sales manager.

The Association of American Battery Manufacturers, 2706 First Central Tower, Akron, O., held its spring meeting May 22 and 23 at the Hotel Statler, Detroit, Mich. The interesting program included several papers and a talk by W. J. Cameron, of the Ford Motor Co.

Chemigum Production Increased

Goodyear Tire & Rubber Co., Akron, recently completed its new plant, begun last winter, for the production of its synthetic rubber, Chemigum. The one-and-two-story building, 58 feet wide by 140 feet long, has a daily capacity of five tons and is employing about 75 men. Operations to date, however, have been on a lesser scale. Goodyear has been operating a small pilot plant for the past three years.

Plant Expansions

Goodyear has announced that the Pliofilm plant at St. Mary's will be doubled in size and that the original molded goods plant there, now having considerable defense production on hand, particularly rubber tracks for army tanks, is completing its third expansion since the factory was laid out in 1939. The St. Mary's expansion, totaling 27,000 cubic feet of floor space, will cost approximately $375,000 for building and equipment. The plant now employs about 950 workers.

The textile mill at New Bedford, Mass., acquired by Goodyear in 1924 to produce tire fabric, which, however, has been idle several years, will be converted into an assembly plant for pneumatic boats, bullet-seal fuel tanks for airplanes, and possibly for barrage balloons. Jack Cress, Goodyear construction engineer, is already in New Bedford getting remodeling work started. Little machinery, though, will be needed as the assembly is mostly hand operation. J. E. Murphy, personnel manager at Rockmart, formerly at New Bedford, has returned there and on June 1 started hiring the force of 400 believed necessary.

The Goodyear gymnasium at Akron, largest in the state, has been closed for the summer, and workmen have moved in to fit it up as an assembly floor for the balloon room. The top floor of the building was previously turned over for the same purpose. By coincidence, this was the first use of the gym in 1918 during the World War.

Stewart Reed, Export, has been home on leave after 12 years in Australia as advertising manager. The Reeds will return to Sydney the latter part of this month.

Aviation Activities

Carrying a good-will greeting from the rubber industry to the Memphis Cotton Carnival, the Goodyear airship *Reliance* wound up its twelfth season in Florida last month with a flight to Memphis from Miami on its way back to Akron. J. A. Boettner, chief pilot, brought the craft to Memphis on the opening day of the carnival.

The rubber industry is one of the largest consumers of cotton, using fabric as the base for tires, hose, belting, and many other products including airships and balloons. Goodyear last year purchased more than 60,000,000 pounds of cotton.

The United States Navy has ordered eight blimps from Goodyear for convoy, anti-submarine and mine defense and plans to acquire 21 more.

Schoaff on Leave

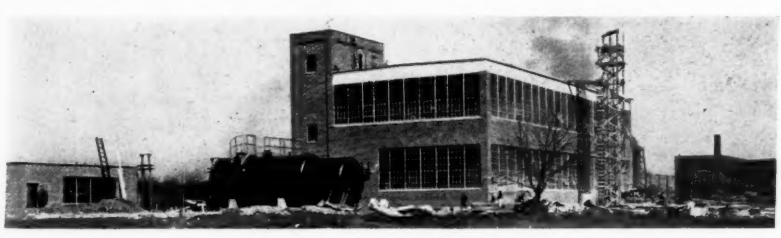
Paul S. Shoaff, resident director of Goodyear's Sumatra plantations is in Los Angeles, Calif., enjoying a 3½-month leave, after having conferred with company officials in Akron. He emphasized the need of a continuity of ample shipping space to maintain sufficient supplies in this country of strategic materials, including rubber.

The General Tire & Rubber Co., Akron, has announced improvement in the tread design of its Silent Grip tire, originally introduced in 1930. Where formerly there were heavy gripping angles every few inches around each rib, there are now, in addition, saw-tooth angles every quarter-inch to give a total of 3,504 gripping teeth in each tire. The new tire retains the General feature of 14,000 tiny rubber wedges in the tread surface, said to provide a windshield wiper action on wet pavements.

Ray W. Brown has resigned as manager of the General Tire aeronautical department to join the Naval Air Force. His son Jack is now with the mechanized infantry division of the Army.

The Timken Roller Bearing Co., Canton, almost on the twenty-fifth anniversary of its entrance into steel manufacturing, began the operation of a new 65-ton electric furnace to advance output to 360,000 tons annually.

Seiberling Rubber Co., Akron, has arranged for factory warehousing and distribution in the Pittsburgh, Pa., area with John Sleigh, now head of the Ideal Tire & Rubber Co., 325 Liberty Ave. Mr. Sleigh was associated for the past 15 years with the Overman Tire Co., operating the business as his own agency until the manufacture of that tire was discontinued. At his new place of business, besides handling Seiberling tires, tubes, etc., Mr. Sleigh will operate a complete tire recapping plant.



Goodyear Chemigum Plant When under Construction

MIDWEST

Latex for Missing Ears and Noses

Dr. Arthur H. Bulbulian, of the Mayo Clinic, Rochester, Minn., has perfected a process of making artificial restorations of ears and noses by utilizing compounded, prevulcanized latex.

The latex is poured into a mold and dries at room temperature, resulting in a highly elastic soft, and pliable material that can be dyed the exact color of human flesh. Advantages of casting latex for artificial features as compared with plastic surgery, which, however, is recommended wherever possible, are: lower cost, less time, and the provision of an easier and more adaptable process, which will, nevertheless, present a natural and life-like appearance and feel.

Thirty-three rubber firms in the Midwest recently reported paying 23,044 employes $738,000 in wages, gains of 2.3 and 4.6% over the previous month.

Monsanto Chemical Co., St. Louis, Mo., at a board meeting on May 16 elected as a vice president Robert Rast Cole, of Anniston, Ala., general manager of Monsanto's phosphate division.

F. H. Banbury, of Farrel-Birmingham Co., Inc., Ansonia, Conn., on May 1 addressed about 250 engineers of the senior class of Purdue University, Lafayette, Ind. His talk, illustrated by lantern slides, concerned the Banbury mixer and its application to the rubber and plastics industries.

National Association of Purchasing Agents, 11 Park Place, New York, N. Y., added the following names to the final list of exhibitors at its Inform-a-Show, held in conjunction with the Association's twenty-six annual international convention at the Stevens Hotel, Chicago, Ill., May 26-29: Dayton Rubber Mfg. Co., Dayton, O.; Eberhard Faber Pencil Co., Brooklyn, N. Y.; and S. C. Johnson & Son, Inc., Racine, Wis.

Thiokol Corp., Trenton, N. J., and **The Dow Chemical Co.,** Midland, Mich., which manufactures the synthetic rubber for the former organization, have begun operations at the recently completed plant in Midland adjacent the "Thiokol" plant in operation since 1938. The new unit, with capacity of more than 150,000 pounds a month, is operating 24 hours a day, seven days a week, and monthly production capacity of the two plants exceeds 330,000 pounds of "Thiokol." So great is the demand for the synthetic, especially for national defense that Thiokol officials already are planning construction of a new unit, to increase capacity 50%, to be started as soon as sufficient demand arises over present needs. This proposed unit combined with present facilities would result in output of six million pounds of "Thiokol" annually, compared with 4,000 in 1930, the first year it was made.

OBITUARY

Harry Tipper

HARRY TIPPER, general sales manager since May, 1940, of Brown Rubber Co., Inc., Lafayette, Ind., died there suddenly of a heart attack on May 7. Funeral services were held in Lafayette on May 8, and cremation followed in Indianapolis. The ashes were then taken to New York, N. Y., where a private funeral was held for the family.

Mr. Tipper, who was born in Kendal, England, June 20, 1879, attended schools in Glasgow and London before coming to the United States in 1903. His business connections follow: construction helper on the Hudson and Manhattan tunnels; sales engineering; advertising manager of the Texas Oil Co.; vice president of the General Motors Export Division; head of the American Manufacturers Export Association; and publisher of *The Overseas Trader*. The deceased was also a well-known lecturer and writer on many industrial and technical subjects and was a co-founder of the Department of Marketing at New York University, where he taught for eleven years. Through an invitation by New South Wales he spent a year in Australia helping organize marketing education.

During his lifetime Mr. Tipper held office and membership in many organizations, including Association of National Advertisers, Advertising Club of New York City, Technical Publicity Association, New York Business Publishers Association, Advertising Federation of America, Associated Advertising Clubs, Export-Import Bank, and Lafayette Rotary Club.

He is survived by his wife, two sons, three daughters, and two brothers.

Frederick F. Curtze

AFTER an illness of many years Frederick Felix Curtze, chairman of the board of the Columbian Carbon Co., 41 E. 42nd St., New York, N. Y., died at his home in Erie, Pa., May 7. The deceased had been president of the company since its inception in 1914 until April 2, 1940, when he was named chairman. Mr. Curtze was one of the real pioneers in the business, and his activities date back to the early days in Pennsylvania when carbon black was first produced, at which time he became associated with Edwin Binney and C. Harold Smith among others of the founders of the industry. Mr. Curtze had also been connected with various other enterprises, including, as president and a director, Coltex Corp., Columbian Gasoline Corp., Southern Gas Line, Inc., Union Iron Co., Heisler Locomotive Works, and Erie Mfg. & Supply Co., and La Del Oil Properties (vice president and director).

Born in Fairview Township, Pa., March 5, 1858, he attended high school two years. Mr. Curtze was also a Mason.

The funeral and interment occurred in Erie, May 9.

Survivors include the widow, a daughter, a son, a brother, and a sister.

Frederick F. Curtze

Harry N. Whitford

HARRY N. WHITFORD, for the past 16 years manager of the crude rubber department of The Rubber Manufacturers Association, Inc., 444 Madison Ave., New York, N. Y., and one of the world's authorities on crude rubber production, died May 17 at his home in Bronxville, N. Y., after a long illness.

Dr. Whitford was born in Manhattan, Kans., in 1872 and attended Kansas State College (B.S.C., 1890). Thereafter he taught school and did post graduate work, specializing in botany and receiving his M.A. degree in 1900. From 1898 to 1903 he attended the University of Chicago (Ph.D., 1903), doing special graduate work in botany and biology and also instructing in biology at Armour Institute. Dr. Whitford then spent several years in the Philippines on special botanical and forestry work for the Department of Agriculture and for several years thereafter made further special study of forestry conditions in British Colombia. For a time also, Dr. Whitford was Professor of Forestry at Yale University. While former President Hoover was Secretary of Commerce, when investigations were being made of rubber growing possibilities throughout the world, Dr. Whitford was engaged by the Department of Commerce to supervise this survey. Dr. Whitford was one of the first to estimate correctly the tremendous rubber growing capacity of the Dutch East Indies, which he made after exhaustive personal trips throughout these tropical areas.

Dr. Whitford belonged to many scientific societies.

On May 18 private funeral services and burial took place.

Dr. Whitford is survived by his wife and one son.

Harry N. Whitford

J. L. McKnight

J. LEE McKNIGHT, assistant secretary of The B. F. Goodrich Co., Akron, O., and head of its legal department, passed away suddenly, in his sleep, at his home in Hudson O., May 15. He had joined the Goodrich legal department in 1918 and became assistant secretary of the company in 1921 and Goodrich counsel and head of the legal department six years later.

Mr. McKnight, who was born in Mt. Lebanon, Pa., 55 years ago, was graduated from Washington & Jefferson University and the University of Pittsburgh Law School. He belonged to the Masonic order and Phi Gamma Delta.

Funeral services were held May 17 at the Hudson Congregational Church.

Mr. McKnight leaves his mother, his wife, a son, a daughter, a sister, and a brother.

Samuel B. Stone

SAMUEL BRADFORD STONE, well-known chemist, died May 6 after a short illness and operation in Tucson, Ariz., where he was engaged in research at the University of Arizona. Dr. Stone had served as a research chemist at the General Laboratories of the United States Rubber Co., in Passaic, N. J., from March 23, 1926, to May 15, 1927, and from June 22, 1930, to May 31, 1932. He also had done similar work for The Barrett Co., New York, N. Y. But Dr. Stone devoted most of his time to teaching and had been with the College of the City of New York, Lafayette College, and Brooklyn College. He was also assistant editor of *The Journal of Rheology* and had written many papers and books on chemistry.

The deceased was born at Phillips-

burg, N. J., 45 years ago and attended Lafayette College (B.S., 1921; M.S., 1923) and University of Chicago (Ph.D., 1926). He belonged to Phi Beta Kappa, Sigma Xi, Lafayette College Alumni Association, and the Brooklyn College Research Committee.

He is survived by his wife and two sons.

Funeral services were held in Easton, Pa., May 11.

Harold T. Merriman

HAROLD THURSTON MERRIMAN, president and treasurer of the American Wringer Co., Inc., and of the Para Thread Co., Inc., both of Woonsocket, R. I., died at his home in Providence, R. I., on April 10. Prominent as an industrialist and financier, he was identified with numerous commercial corporations and also served as president and treasurer of the Lippitt Woolen Co., Woonsocket, as vice president of the Morris Plan Co. of Rhode Island, and as a director and executive committee member of the Industrial Trust Co. of Providence.

Mr. Merriman was born in Providence on July 10, 1870, and was graduated from Brown University, in 1894. An expert fisherman and hunter, he belonged to several fish and game clubs.

Funeral services were held at his late residence April 14, with burial in Swan Point Cemetery, Providence.

Survivors include the widow, a son, a daughter, three grandchildren, and two brothers.

FROM OUR COLUMNS

50 Years Ago—June, 1891

The Woonsocket Rubber Co. intends lighting its new Alice mill by electricity throughout. (p. 239)

The price of aluminum today is $1.50 a pound. (p. 239)

Speaking of elastic bands, we have some put around papers in our store in 1861 which are as good as new. (From a letter to the editor.) (p. 244)

Speaking of cultivation of rubber, it is impracticable in Brazil. There is enough rubber; it is the difficulty in getting it, the unhealthiness of the climate, and the problem of labor. (p. 247)

The Providence rubber shoe was manufactured in the thousands from 1839 to 1849. The exterior or rubber portion was composed of India rubber, camphene, and lamp-black, and strengthened by linen cloth or netting. The process of curing consisted in immersing the shoe in a boiling combination of muriatic and nitric acid. To give a smooth and bright appearance, a thin coat of sizing was used. (From the deposition of L. M. Ware in the Hayward Patent Suit.) (pp. 253-54)

In 1851, the India Rubber Comb Co. was organized, taking at that time a store at 44 Cliff St. The factory was first at Williamsburg, Long Island, but in 1854 was moved to College Point. (p. 256)

E. H. Clapp is the pioneer manufacturer of reclaimed rubber. (p. 266)

25 Years ago—June, 1916

According to the researches of I. I. Ostromyslenski and F. F. Koschelev, isoprene heated cautiously at 176-194° F. yields β-myrcene which when heated with sodium and barium peroxide at 140-158° F. is converted into caoutchouc. The polymerization of pure β-myrcene may possibly represent the only synthesis of natural caoutchouc, that is, of a substance perfectly identical with natural Para caoutchouc, both in the general structure of its nucleus and also in the positions of the methyl groups and double linkings of the molecule. (p. 467)

G. Stafford Whitby's investigation of rubber from young and from old trees gave no support to the widely accepted opinion that the latex from young trees is inferior. Also it was ascertained that air-dried plantation sheet is quite equal, if not superior, in quality to smoked sheet. (p. 467)

According to M. Kerbosch, the superiority of the Brazilian method of coagulation is probably due chiefly to the retention of the soluble constituents of the latex, and not to smoking. (p. 468)

H. W. Kugler, in June, 1909, became head of the chemistry and experimental department of the Firestone factory. (p. 497)

CANADA

Trade with Peru

South American countries are among Canada's best customers for rubber tires and inner tubes. In a statistical review of imports M. J. Vechsler, Canadian Trade Commissioner at Lima, Peru, reports the large share of this trade is due to deliveries in many cases, in whole or part, from branches of United States Firms in the Dominion. During 1940 tire imports into Peru totaled 1,300,306 kilos, against 1,106,431 kilos in 1939. Canada supplied about half. These imports have increased yearly since 1934, when they were 408,953 kilos; the largest advances occurred in 1937 and 1939. Imports of inner tubes have increased less regularly from 48,842 kilos in 1934 to 86,985 kilos in 1939 and 98,952 kilos last year. Unless a setback occurs in Peruvian economy, says Mr. Vechsler, the trade believes this steady development will continue, although a slight recession is expected this year. In 1939 pneumatic tire casings came second in value of Canada's exports to that country, according to an analysis by the Canadian Pacific Railway Co.'s department of industrial progress. These exports totaled $413,600, and inner tube exports $53,400. Exports of other rubber manufacturers to Venezuela in 1939 were valued at $11,100.

Dominion Department of Munitions and Supply, Ottawa, Ont., recently awarded the following contracts: *aircraft*, Dunlop Tire & Rubber Goods Co., Ltd., $8,897; *land transport*, Firestone Tire & Rubber Co. of Canada, Ltd., $9,859, Goodyear Tire & Rubber Co. of Canada, Ltd., $12,120; *ordnance*, Dunlop, $54,650; *personal equipment*, B. F. Goodrich Co. of Canada, Ltd., $30,476, Miner Rubber Co., Ltd., $82,500; *capital expenditure*, Goodyear, $598,378.

Canadian Credit Men's Trust Association, Quebec division, which reported a large manufacturer had stated his tire sales for the first quarter were considerably in excess of the same period last year, gave automobile tires a good rating last month.

Dominion Rubber Co., Ltd., Montreal, P. Q., last month held its annual meeting at which Eric Burkman and Arthur Surkamp, both of the United States Rubber Co., New York, N. Y., were elected to the board, succeeding Ross H. McMaster and E. W. Nesbitt. All other directors were reelected. Albert Charles Phillips, 50, veteran Dominion employe, died suddenly on April 27.

Ronald Donaldson, special sales representative of the B. F. Goodrich Co. of Canada, Ltd., recently addressed the Kitchener, Ont., Young Men's Club on rubber.

Vincent P. Reid, vice president and general manager, General Tire & Rubber Co., Toronto, Ont., in an address to 250 tire distributers and users at the Mount Royal Hotel, Montreal, P. Q., declared Canadians are changing their spending habits now that more prosperous conditions prevail. Cheaper makes of merchandise now find the going harder; while the higher quality brands are finding a readier market, Mr. Reid stated, speaking from observations of sales from coast to coast. He further declared that his own company's sales so far this year had increased 37% over the corresponding period of 1940. He looked for large gains for the year as a whole and told the dealers that the company would assist them make greater sales by putting on an extensive advertising campaign during ensuing weeks.

Canada Wire & Cable Co., Ltd., Leaside, Ont., has assigned to Vice President W. H. Marsh the additional duties of his former office of treasurer to succeed J. E. McCallum, resigned. A. R. Winnett was named assistant treasurer.

EUROPE

GERMANY

Leipzig Spring Fair

The Leipzig Spring Fair of 1941, held from March 2 to 7, is said to have been exceptionally successful. About 9,000 foreign visitors in addition to 350 buyers from the General Government (Poland) and over 1,500 from the protectorate Bohemia and Moravia were reported; while visitors from Germany proper were estimated to have exceeded 100,000. Applications had been received from 6,500 exhibitors representing 21 different countries, including Belgium, Bulgaria, Denmark, Finland, Rumania, Sweden, Switzerland, Slovakia, Spain, U.S.S.R., Yugoslavia, Hungary, Iran, Italy, Netherlands, Norway, the protectorate Bohemia and Moravia, and, for the first time, the General Government.

Business was extremely active, reflecting the general hunger for goods in the different foreign countries. The demand for some types of goods and the crowding at certain stands were so great that exhibitors were forced to close their stands for short periods so as to be able to deal with the buyers as they came. A list of the goods shown indicates that raw materials and foodstuffs were the main attractions at most of the foreign stands, although some countries also showed industrial goods and art specialties.

At the stands representing the German rubber industry, no real novelties were to be seen, but the usual lines now, however, generally made of buna, Igelit, and Oppanol. In a few cases a certain amount of natural rubber was still used. While the range of goods on display was wide and almost gave the impression of a peace-time show, sales of a large number of articles were hampered by the special restrictive laws which it has been found necessary to impose in order to insure priority for military requirements. The manufacture of such goods is strictly controlled, and special permits are required for selling. However the aim of the fair, as far as German manufactures are concerned, is frankly admitted to be propagandistic and with post-war business clearly in view. It is intended to impress foreign buyers with German potentialities in industrial fields and to form and strengthen foreign business activities in all possible directions.

Incidentally, some of the German-occupied territories appear to be rapidly learning the lesson of the New European Order. The Rumanian propaganda minister, in opening the Rumanian stand, in the course of his speech called the Leipzig Fair the world's market place and declared that Rumania, whose economic life was closely bound to Germany, saw in it a living symbol of the New European Order.

Hard Rubber Dust

A note on hard rubber dust in a recent issue of the *Gummi-Zeitung* calls attention to the early practice of preparing the dust from old rubber. The writer of the item quotes from Dr. Kurt Gottlob's "Technologie der Gummiwaren", published in 1915, in which it is stated:

"Formerly so-called artificial dust was also produced; floating scrap was mixed with sulphur, vulcanized, ground and sieved. Today this method has been abandoned."

In Ditmar's "Technologie des Kautschuks", published in the same year, continues the writer, a more detailed description of the process is given from which it also becomes clear why the method was discarded. The author then goes on to describe an improved process by which he claims a serviceable dust can be prepared from old rubber. From the scrap, which has been washed, ground, and passed over magnetic separators, a super-heated steam reclaim is first made. This is mixed with the proper amount of sulphur and made into sheets one to 2 millimeters thick. These sheets are not very smooth, but this is not necessary. They are then placed between metal sheets, stacked up, and vulcanized to hard rubber. The hard rubber sheets are ground, and the dust sifted in the usual

fashion. If the scrap rubber used is properly selected, the resultant dust can even be used for articles which are to have a high polish.

Company Notes

The Odrau branch of the Optimit Gummi-und Textilwerke A.G., Prague, which has been under the management of a commissar since October 10, 1938, is reported to have been acquired recently by a group of German manufacturing concerns, among which are: Gummiwerke Elbe, A.G., Klein-Wittenberg (Elbe); Gottfried Hagen A.G., Cologne-Kalk, Hoxtersche Gummifadenfabrik Emil Arntz, K.G., Hoxter i.W.; Kolnische Gummifadenfabrik, vorm. Ferd. Kohlstadt & Co., Cologne-Deutz; and Standart Gummiwerk Baumgarten & Co., K.G., Cologne. The new undertaking, registered as Optimit, Gummi-Kabel-und Textilwerke, A.G., with headquarters in Odrau, East Sudetenland, has a capital of 1,000,000 marks. It will expand the already existing works and manufacture and deal in goods of rubber, rubber-like materials, insulated cables and wires, textiles, and by-products.

The Triton Gummischwamm Compagnie G.m.b.H., Dresden, formerly specializing in the manufacture of rubber sponges, has been reorganized. It is now to be known as Triton G.m.b.H., fur Landwirtschaftlichen u. technischen Bedarf, and will produce agricultural and technical supplies.

At the March 22 meeting of Veithwerke A.G., Sandbach b. Hochst, a 7% dividend was again proposed. The company has raised its capital from 1,100,000 to 1,650,000 marks.

Following the death of Alban Kibele, a member of the firm of Auguste Kibele & Co., Weissenfels, manufacturer of surgical instruments and rubber goods, the concern is being continued by Franz and Josef Kibele with the consent of the heirs.

GREAT BRITAIN

Research on Plantations Stressed

Following his correspondence on research to improve natural rubber, F. D. Ascoli now offers an outline of the research that should be undertaken by the plantation end of the rubber industry. By way of introduction, he emphasizes that the plantation industry must face the fact that in view of certain superior qualities and the availability in America of cheap basic materials, mass production of synthetic rubber is possible and may render it competitive with natural rubber in certain fields, whereupon the urge for self-sufficiency in raw materials must cause an extensive swing-over to synthetic rubber. Although natural rubber will in all probability retain its price advantage, this will be compensated by the quality advantage of synthetic rubber. Under the circumstances the future of plantation rubber depends on improving it where it is inferior to synthetic rubber.

Synthetic rubbers, he points out, start with two main natural advantages: (1) they are prepared from materials free from impurities; hence each type may be uniform and homogeneous; (2) various types can be produced, each superior to natural rubber in certain specific properties. Not all of the properties of synthetic rubbers are of first importance in the main uses of rubber, that is the production of tires; the chief improvements to be aimed at are: abrasion resistance, aging, heat conductivity, low or variable stretch, low power loss, cracking resistance.

Dealing specifically with the problem of plantation research, Mr. Ascoli states that here the chief object should be the discovery or creation of reproducible "sports" in the rubber tree, and this should be supplemented by experimentations to modify the characteristics of the existing globule in the earlier stages of its existence. He recommends the following program:

I. Modification of existing rubber globules by
   a. means of polymerization agents on latex after tapping;
   b. experiments in new methods of drying latex, e.g., by freezing, or other methods of avoiding depolymerization of the rubber globule by mechanical working.

heat or oil degradation, e.g., by atomized spraying at low temperatures.

c. avoiding alkaline preservatives tending to degrade the outer material of the rubber globule, or, alternatively, their more intensive use to degrade the outer material and to rely on the inner material of the globule.

d. modifying the characteristics of the rubber globule by inoculating the young tree or producing different types of latex by feeding different chemical ingredients to the tree, thus following up Dr. Roach's work of inoculating trees with curative or fertilizing ingredients; variations produced by hormones and colchicin should also be considered.

e. studying the effect of different fertilizers and plant food on the rubber globule.

II. Examination of globules of other rubber trees, as *Ficus Elastica, Castilloa, Ceara, Manihot*, etc., with the above objects in view.

III. a. Examination of latex from existing trees, clones, and crosses, to discover "sports" among the rubber globules. At the Research Institute of Malaya variations have been observed in the water absorption, curing properties, and plasticity of rubber from certain trees and clones, and it is felt that such variations might be intensified and developed in different families of trees.

b. Expedition for discovering "sports" in Brazil.

IV. Creation of new crosses and "sports". Since the hydrocarbons of rubber, gutta percha, and turpentine have the same empirical formula, C_5H_8, some method of crossing might yield a modified rubber globule.

Dr. Schidrowitz, commenting in "Views and Reviews" in the *India Rubber Journal*, says that while he has little to criticize seriously in the scheme, he feels that a wrong impression may be created if it is taken for granted that the whole future of plantation rubber depends on the success or failure of efforts to improve it where it is inferior to synthetic rubber. Again, referring to Mr. Ascoli's remark that one of the "main natural advantages" of the synthetics is their uniformity or homogeneity, he points out that there is reason to believe that with certain methods of polymerization the control of quality (e.g. non-variability) is by no means a simple matter.

In connection with the methods of drying latex, he recalls that sprayed latex has been tried on a large scale, but has not found widespread use. While such rubber may have superior qualities to acid coagulated rubber, it is more difficult to process, a characteristic it has in common with some synthetic rubbers.

"One may well find," he adds, "that by improving one quality, another most desirable attribute may be eliminated."

British Rubber Publicity Association

The recently published second report of the British Rubber Publicity Association covers the work done in 1939, including the study of uses of rubber in agriculture, as Pliofilm for covering butter and cheese, rubber hose for spraying equipment and for warming soil to force salad crops, rubber in harvesting machinery and in bracken eradication, rubberized canvas for harvesting binders, rubber bags for temporary silos and for meat in transit; coverings for machinery parts that come in contact with manure; rubber tines for potato diggers, and rubber on fruit grading machines to prevent bruising.

The best means for cleaning and maintaining rubber flooring were studied, and the results published in a special pamphlet and distributed to hospitals, hotels, etc.; the best type of rubber sheeting for concrete finishes was tested.

The staff of the Association was transferred to Croydon in September, 1939, where in collaboration with the Research Association of British Rubber Manufacturers an Enquiries and External Contacts Division was created.

The board of the Association has decided that its present policy must be to adapt its activities to the changing conditions of the hour, dropping those which under existing conditions have become unproductive and following up whatever new openings may be presented by the war. The board consists of: F. E. Maguire, chairman; E. Jago, vice chairman; A. C. Mathew; F. G. Smith; James Fairbairn, past chairman.

Import and Export Licenses

According to a new ruling, rubber, balata, and gutta percha, and certain products thereof, which formerly required export licenses to certain destinations only, must now have licenses for all destinations. The full list is: rubber, balata and gutta percha; rubber latex; reclaimed rubber; scrap and waste wholly or substantially rubber; thread, rod, tubings, sheeting, strip, and slab wholly of balata, gutta percha, or hard or soft vulcanized rubber (including compounded rubber).

Rubber Suction Pads

A special type of rubber suction pad, which is held in a metal cup and operated by means of a lever, is claimed to lift 75 pounds and to pull one hundredweight. It is produced by F. J. Edwards, of London, and appears to have already found use as a sheet metal lifter in press shops.

EUROPEAN NOTES

Sweden

Effective February 1, 1941, the Swedish Government has ordered the confiscation of all stocks of waste and old rubber goods held at this time and of all imports of these goods arriving after this date. The measure has been taken so that all available waste and old rubber may be made use of and to prevent speculation and resultant increases in the cost of the finished goods. In future, waste and old rubber will only be delivered to dealers who have the express permission of the Industrial Commission.

The Government has also decided to expropriate tires and tubes for bicycles, automobiles, and motor cycles, as well as bus and truck tires weighing over 15 kilograms when new, and inner tubes for these tires. All stocks held by the trade or manufacturers are affected by the new order except tires and tubes already mounted on wheels or spare wheels, and stocks for which export licenses had been obtained before the expropriation date; exempt also are automobile and motorcycle tires in the hands of private individuals. A purchasing license is required for all tires except bicycle tires; and when a new tire is bought, an old tire of the same size must be turned in by the purchaser.

Denmark

Starting November 27, 1940, a series of exhibitions of German synthetic materials was initiated in Denmark, under the name "New German Working Materials." The first and most important was held in Copenhagen from November 27 to December 27, 1940, and was followed by others in Aarhus, Odense, and a few more Danish cities. The expositions, which are said to have been most successful, appear to have been started in response to requests from Danish industrial circles as a result of the growing lack of raw materials since the war, and the German authorities were pleased to take this opportunity of acquainting the outside world with the good qualities of the products that have been developed in Germany in recent years.

Among the German concerns represented at the shows were: the Allgemeine Elektrizitats Gesellschaft, I. G. Farbenindustrie, Venditor Kunststoff-Verkaufs-G.m.b.H., Siemens & Halske. Exhibits included buna, cell-wool, all kinds of plastics, new materials for the cable industry, substitutes for leather, cellophane, plexiglas, etc.

Russia

All enterprises which manufacture rubber, tires, and asbestos are to be included in a recently established all-Union commissariat for the rubber industry. A new commissar, T. B. Mitrokhin, has been appointed.

Holland

Rubber Foundation, through Director-General R. Houwink, has announced that the offices of research department, formerly at Willem de Zwijgerstraat 11, and of the patents department, Willem de Zwijgerstraat 27, both in Delft, Holland, and of the technico-commercial department, Heerengracht 182, Amsterdam, have all been moved to Julianalaan 89, Delft; but the Secretariate of the Board of the Rubber Foundation remains at its old address in Amsterdam (C), Heerengracht 182, P.O. Box 827.

FAR EAST

MALAYA

Palm Oil and Bark Renewal

About a year ago the Rubber Research Institute of Malaya reported on experiments carried out with palm oil alone and palm oil mixed with fungicides, applied to the bark of *Hevea* to discover the effect on bark renewal. It was found that the application of controlled quantities of palm oil to the freshly tapped bark of old hard-barked rubber trees improved the subsequent renewal of the bark, but that the inclusion of fungicidal oil in the palm oil gave no added advantages, unless to control panel diseases.

Recently the matter arose again, and in reply to certain inquiries by the Planting Correspondent of the *Straits Budget*, the Institute gave some further information. Thus it was explained that it is not known whether palm oil treatment increases the size of the latex vessels or even whether it produces thicker bark renewal in the end. All that is known at present is that it produces quicker bark renewal. In one instance bark treated with palm oil was soft and tappable after only six months' renewal and gave a good yield; whereas untreated renewed bark of the same age was hard and untappable. In another case a marked increase in yield was noted five months after bark below the tapping cut had been scraped and treated with the oil. However it is uncertain whether the palm oil or the scraping caused this result. It seems unlikely, the Rubber Research Institute's statement continues, that palm oil could affect the size or number of the latex vessels of bark that was fully renewed before treatment, though it might render the bark more succulent and affect the yield of the latex. Sun exposure may undoubtedly have a harmful effect on oil-treated bark if several successive oil applications are made on the same area of the bark. There should therefore be no overlapping of these treatments.

It seems that a large number of estates in Malaya are experimenting with palm oil to stimulate bark renewal and at least one is said to be sufficiently pleased with results to have adopted palm oil treatment on a full commercial scale.

Packing of Rubber in Bales

The war has had the effect of turning an increasing number of shippers from the use of cases to bales for packing crude rubber, not without some financial benefit to exporters. An instance is reported in a local paper where an estate made a larger profit on rubber sent in bales than on that packed in cases, although there was a premium on rubber arriving in cases. Costs for labor and material in this instance were 0.09-cent and 1.16 cents per pound, respectively, for cased rubber, and 0.18-cent and 0.27-cent, respectively, for baled rubber, showing a difference of 0.80-cent per pound in favor of baled rubber. About 0.45-cent per pound was deducted in London for the baled rubber, but even after this there was still a favorable margin of 0.35-cent per pound. Incidentally the baled rubber was very favorably reported on by the London brokers who

wrote to the manager of the estate, which packed the rubber, that if they could be sure that all rubber packed in bales would arrive in a similar condition, the objections to baled rubber would soon disappear. Nevertheless baled rubber was penalized to the extent of some 0.45-cent per pound.

The Rubber Industry in Johore

More rubber is produced in the State of Johore (Unfederated Malay States) than in any other of the states in Malaya. In 1940 output exceeded all previous records, and exports for the year totaled 144,952 tons, 26% of total Malayan output.

At the end of 1940 the total area under rubber in Johore was estimated at 954,478 acres, against 941,129 acres in 1939. This area was divided among 75,616 holdings, of which 553 were large holdings with combined planted area of 559,712 acres, including 469,142 acres of tappable rubber, 361,519 acres of which were actually in tapping during December, 1940. In addition were 2,287 medium holdings with planted area of 110,157 acres, of which 97,865 were tappable; and 72,776 small holdings with total planted area of 284,609 acres, of which 249,161 acres were mature.

The net acreage of budded rubber on large holdings is 106,416 acres, of which 54,322 acres were reported tappable, but the budded area actually in tapping was 41,569 acres. About 20,452 acres of the whole were budded during 1940. On medium and small holdings, the total budded area was only 2,425 acres.

There was increased replanting during the year; the total replanted area amounted to 14,018 acres, against 11,334 acres in 1939. It is to be noted that only a small part of the replanted area was on medium and small holdings, while large holdings accounted for 12,529 acres. Smallholders seem to have shown practically no interest at all in replanting.

NETHERLAND INDIA

Rubber Other Than *Hevea*

The annual report on the export crops of the Netherlands Indies in 1939, issued by the Central Bureau of Statistics, Java, reveals that there are still a number of estates in Java as well as in the Outer Provinces which have small plantations of rubber trees other than *Hevea*. *Ficus elastica* is found on 68 estates in Netherland India, covering 3,437 hectares. Of these estates 53, with combined area of 2,586 hectares are in Java; 13 with total area of 826 hectares are in Sumatra; and two with an area of 25 hectares are in the other Outer Provinces. *Manihot Glaziovii* is found on two estates in Java, on 72 hectares. Finally there are 97 hectares under *Castilloa elastica*, divided among three estates, of which two, with a combined area of 47 hectares are in Java, and one of 50 hectares is in Sumatra. No information is given regarding the production of these areas.

Ficus elastica is also grown by natives in the Outer Provinces, and from time to time small amounts of native ficus rubber are shipped. In 1937, 28 tons of this rubber were exported, and in 1939, 17 tons; no shipments were made in 1935, 1936, and 1938.

Gutta Percha Statistics

The Central Bureau of Statistics also reports that the Government gutta percha estate in Java produced 192,865 kilos of gutta percha in 1939, against 109,960 kilos in 1938. For several years the area of this estate had apparently not been extended, but in 1939 it was increased from 1,139 to 1,161 hectares. Two gutta percha estates in Sumatra cover 171 hectares, but no output is reported for them.

Gutta percha exports from Java totaled 317 tons in 1939, against 260 tons in 1938. Besides, there were native shipments from the Outer Provinces, 2,564 tons in 1939, against 2,350 tons in 1938. These consisted exclusively of wild gutta and included a variety of different types, as gutta hangkang, gutta merah, gutta beringin, etc.

Editor's Book Table

BOOK REVIEWS

"Rubber and Its Uses." Harry L. Fisher. Published by Chemical Publishing Co., Inc., 236 King St., Brooklyn, N. Y. 1941. Cloth, 5½ by 8½ inches, 128 pages. Indexed. Price $2.25.

Here is a book that the uninformed can read quickly and obtain a clear picture of what rubber is, what is its history, where it comes from, how it is obtained, and how it is manufactured into the many articles of daily use. As the author points out, the volume grew out of his experiences, during 17 years as a rubber research chemist, in lecturing before many different groups. The intent is to tell this story of rubber in the space of a volume that can be read in one sitting. In consideration of the imposed brevity of treatment, the amount of information packed within the book's pages is amazing.

After sketching the history of the rubber industry, succeeding chapters in the book deal with: the sources and production of crude rubber; the properties of crude and vulcanized rubber, and the importance of vulcanization; compounding and vulcanizing; manufacturing rubber; latex manufacturing processes; synthetic rubbers or elastomers; and rubber derivatives. A list of reference works for supplemental reading is included. Not only will the uninitiated profit from this book, but those connected with the rubber industry should find pleasure in a book which so clearly explains this difficult subject.

"How to Teach a Job." R. D. Bundy. National Foremen's Institute, Inc., Deep River, Conn. 1941. Cloth, 5⅜ by 8 inches, 60 pages. Price $1.

With greater pressure on industry than ever before to reach maximum production, the appearance of this book for foremen is timely. The author bases an organized plan for quickly teaching specific jobs to new workers, on four essential steps: (1) preparation; (2) demonstration; (3) explanation; and (4) application.

"Patent Fundamentals." Leon H. Amdur. Chemical Publishing Co., Inc., 148 Lafayette St., New York, N. Y. 1941. Cloth, 5½ by 8½ inches, 305 pages. Index. Price $4.

This book, written in understandable language, has two major purposes: to enable the layman and the student to attain a rapid, yet sound, understanding of the U. S. Patent System; and to provide those already versed in the intricacies of patent law with interesting and helpful information. The book tells what can be patented and what constitutes invention, discusses the nature of a patent, and explains how patents are classified and how patent searches are conducted. Also explained are the function and drafting of patent claims, assignments and licenses, and shop-rights, as well as other pertinent subjects.

"Abstracts of Patents Relating to Rubber Latex." T. R. Dawson and R. W. Parris. A supplement to "Rubber Latex." Issued by The British Rubber Publicity Association, 19 Fenchurch St., London, E.C.3, England. 1941. Paper, 5½ by 8½ inches, 136 pages. Free distribution.

The fourth edition of the association's publication, "Rubber Latex", by H. and W. Stevens, which appeared in 1936, contained a section on British patent abstracts on latex, covering the years 1920 to 1935 and ending with patent No. 438,795. A further compilation of 765 British latex abstracts, which now appears in this supplement, has been the result of a survey of 81,580 British patents, covering the series 438,796, December 19, 1935, to 520,375, May 17, 1940. In addition, a number of earlier British latex patents, not included in "Rubber Latex", are given in brief form in an addendum of the current work. Name and subject indices cover all the patents included in the supplement. The subject index has been compiled mainly in relation to product or process.

NEW PUBLICATIONS

"The Royle Forum." No. 14. John Royle & Sons, Paterson, N. J. 8 pages. Reclaim for defense is the central theme of this issue of the *Forum;* statements from several of the large reclaimers are presented; an analysis of scrap rubber availability shows the northeastern section of the country to be the most important source of scrap; and comments on Royle strainers are set forth. New Royle officials, headed by Clifford H. Ramsay, president, are pictorially presented in this issue.

"Rubber: List of Publications by Members of the Staff of of the National Bureau of Standards." LC-634 superseding LC-532. National Bureau of Standards, Washington, D. C. 18 pages. This list, brought up-to-date and covering all publications on rubber by members of the Bureau's staff, includes the following subjects: general information; latex and crude rubber; purification of rubber; forms of rubber—crystallization and other transitions; constants and properties of rubber and isoprene; chemical analysis; dimensional measurements on rubber specimens; physical testing; products; specifications; and commercial standards. The papers listed have appeared in Bureau publications and in various scientific and technical journals.

"Sales Management Survey of Buying Power." 1941 Edition. *Sales Management,* 420 Lexington Ave., New York, N. Y. Price $1. 288 pages. In this detailed analysis of the nation's buying power, designed as an aid in setting sales quotas and allocating advertising appropriations, figures are presented which cover all civil divisions down to cities under 10,000 population. Here sales and advertising executives can find the answer to these questions: where people live; how much they have to spend; how much they do spend; where they spend it; and what they spend it for. According to the survey 1940 effective buying income totaled $74,182,005,000, an increase of nearly $7,000,000,000 over 1939, and the prediction is made that this figure will increase to $83,028,000,000 in 1941.

"Brazil 1939-40, An Economic, Social and Geographic Survey." Ministry of Foreign Affairs, Rio de Janeiro, Brazil, 384 pages. In preparing the English edition of this book from the original work in Portuguese, several modifications and new data were incorporated. As in previous editions, the economic activities of Brazil are emphasized, and considerable space is devoted to the country's natural resources, industrial production, and world trade. Six pages deal with the production of raw rubber, with statistics that show the rise and decline of this one-time great Brazilian industry. Methods of collecting and marketing rubber and the possibilities of rubber cultivation in the Amazon region are discussed.

"Four Vital Spots." United States Rubber Co., 1230 Sixth Ave., New York, N. Y. 36 pages. The four most vital spots in motoring safety, according to this booklet, are those four small areas where the tread rubber on an automobile tire meets the surface of the road. Suggestions to the motorist on the care of tires and facts to consider in the purchase of new tires are presented, together with a discussion of the advantages of the U. S. Royal Master tire.

"Simplex Rubber Insulations." Data Sheet 106. Simplex Wire & Cable Co., 79 Sidney St., Cambridge, Mass. 4 pages. Brief facts and descriptions of Simplex rubber insulations are presented in this data sheet which points out that the firm has been making rubber insulated wires and cables since 1889. Simcore; 30%; heat resistant, superaging; deproteinized and prevulcanized latex (latox); Anhydrex deproteinized; and ozone resistant (Ozex) are among the types of insulation mentioned.

"Petroleum Facts and Figures." Seventh Edition, 1941. American Petroleum Institute, 50 W. 50th St., New York, N. Y. Price $1. 192 pages. A comprehensive statistical picture of the American petroleum industry is presented in this booklet with 241 tables giving figures on utilization, production, refining, transportation, marketing, prices, and taxes.

"The Vital Importance of Timken Bearings in National Defense." The Timken Roller Bearing Co., Canton, O. 32 pages. This booklet, intended to awaken interest in the American preparedness program, pictorially portrays: (1) some of the steps that the firm has been taking to expand its capacity for defense; (2) the importance of Timken bearings and steel in the machinery used for making defense equipment; and (3) the use of the firm's products in defense equipment itself —ships, guns, tanks, trucks, and planes.

"The Vanderbilt News." Vol. 11, No. 3, May-June, 1941. R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y. 20 pages. This issue continues the article, "X-Ray Studies of Rubber", by George L. Clark, which compares two gum compounds containing, respectively, sulphur and Tuads as vulcanizing agents. Diffraction patterns at 500% elongation are shown which indicate greater density of the rubber interference spots in the case of the Tuads compounds. Crystallinity-elongation hysteresis loops are shown by plotting photographic density against per cent elongation. The remainder of the issue presents compounds and test data on: sulphurless Tuads and Selenac cures of high reclaim stocks; increasing proportions of Tuads in sulphurless cures; Altax-Zimate ratios in a wire insulation compound; and activating effect of Kalite No. 1 with American process zinc oxide.

"Farm Tires—Care and Service." Service Bulletin No. 16. The Rubber Manufacturers Association, Inc., 444 Madison Ave., New York, N. Y. 12 pages. This pamphlet is intended for users of farm tractors and implements to aid them in properly using and caring for their pneumatic tire equipment so as to receive maximum tire life and best possible performance. Service information on the removal and application of tires on tractor rims, and discussions of inflation and traction are included; while a section on tire conditions explains and illustrates how tires can be injured and how damage can be avoided. Copies of the bulletin can be obtained from farm tire dealers.

"Commodity Exchange, Inc. Eighth Annual Report." November 30, 1940. Commodity Exchange, Inc., 80 Broad St., New York, N. Y. 12 pages. This report for the fiscal year ending November 30, 1940, contains statements by the president and treasurer of the Exchange, together with a balance sheet of assets and liabilities. According to the president's statement, the volume of trading in rubber during the fiscal year 1940 totaled 34,157 contracts, against 44,373 in 1939, 79,247 in 1938, 95,021 in 1937, and 38,141 in 1936. On June 17, 1940, the report points out, trading was instituted in a new rubber contract permitting a somewhat broader range of deliverable grades and packing.

"Export Control Regulations and Export Control Schedule No. 1." Administrator of Export Control, Washington, D. C. 56 pages. This bulletin, effective April 15, lists the numerous articles and materials subject to export control, gives information on exportation under license, and presents presidential proclamations and military orders covering export control. Those products and materials of direct interest to the rubber industry and subject to export control have been presented in previous issues of India Rubber World.

"Hercolyn and Abalyn Liquid Esters of Abietic Acid." Hercules Powder Co., Inc., Wilmington, Del. 16 pages. Abalyn, produced by the esterification of abietic acid (as rosin) with methyl alcohol, is a liquid resin and plasticizer with reactive double bonds. Hercolyn is essentially Abalyn, hydrogenated in such a way as to saturate the more reactive double bond with hydrogen. Thus Hercolyn is more stable to oxidation and other double-bond addition reactions. The booklet briefly describes the general properties, uses, and formulations of the two materials. Suggested uses in rubber are as softeners, tack-producing agents, and as an aid in dispersing pigments and fillers.

"American Standards." American Standards Association, 29 W. 39th St., New York, N. Y. 16 pages. This new price list covers over 400 standards in various industrial and engineering groups. Several standards relate to the rubber industry.

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Patents and Trade Marks

APPLICATION

United States

2,236,567. **Adhesive Sheeting** Comprising a Tacky and Pressure-Sensitive Water-Insoluble Adhesive Coating Bonded to a Non-Fibrous Film Backing by Means of an Interposed Primer Coating of Partially Vulcanized Rubber and Compatible Resin. R. G. Drew, assignor to Minnesota Mining & Mfg. Co., both of St. Paul, Minn.

2,236,597. **Sheeted Abrasive** Utilizing a Bonding Mixture of Rubber, an Isomer of Rubber, and a Synthetic Resin. L. A. Hatch, assignor to Minnesota Mining & Mfg. Co., both of St. Paul, Minn.

2,236,683. **Flashlight Fountain Pen.** H. Gudge, New York, N. Y.

2,236,693. **Trousers** with Inner Elastic Garment Gripper Belt. S. Newman, New York, N. Y.

2,236,731. **Dispensing Hose** Designed to Prevent Acute Bending Adjacent to the Coupling. C. C. Oberly, assignor to Tokhein Oil Tank & Pump Co., both of Fort Wayne, Ind.

2,236,736. **Night Sighting Means** for Firearms with Shock Absorbing Pad and Bushing. A. B. Scott, Los Angeles, Calif.

2,236,739. **Foot Last Determinator** with Rubber Impression Sheet. I. R. Waltman, Brooklyn, N. Y.

2,236,752. **Hernial Truss and Truss Pad.** A. J. Fish, Carroll, N. H.

2,236,758. **Elastic Fabric.** A. J. Lumsden, Needham, Mass.

2,236,770. **Chiropractic Portable Folding Table** with Sponge Rubber Cushioning Means. C. F. Atwell, Indianapolis, Ind.

2,236,877. **Rotating Glider** with Rubber Band Parts. J. M. H. Jacobs, Dayton, O.

2,236,903. **Tire Construction** with Serrated Tread Ribs. J. E. Hale, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,236,967. **Flexible Connection** for Tubing Utilizing a Resilient Washer. N. M. Couty, Detroit, Mich., assignor to Flex-O-Tube Co., a corporation of Del.

2,237,059. **Auto Door Sealing Strip.** J. S. Reid, Shaker Heights, O., assignor to Standard Products Co., Cleveland, both in O.

2,237,102. **Pneumatic Mattress.** R. W. Sampson, assignor to Sampson Rubber Products Corp. of Del., both of New York, N. Y.

2,237,173. **Conveyer Belt** of Stepped-Ply Type with a Cushioning Insert and Outer Layer of Abrasion-Resisting Material. A. Brill, Youngstown, O., assignor to Lee Rubber & Tire Corp., Conshohocken, Pa.

2,237,175. **Ice Dislodging Apparatus.** R. S. Colley, Kent, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,237,181. **Moccasin-Type Footwear.** C. E. Hosker, Watertown, Mass., assignor to B. F. Goodrich Co., New York, N. Y.

2,237,207. **Tire and Rim** — the Tire Beads Forming a Water-Tight Union with the Edges of Rim and the Tire Being Adapted to Be Filled Completely with Water under Pressure. C. H. Zimmerman and W. W. McMahan, Akron, O., assignors to Wingfoot Corp., Wilmington, Del.

2,237,224. **Stair Carpet.** E. M. Herschmann, New York, N. Y., assignor to Safegard Rubber Products Corp., a corporation of N. Y.

2,237,245. **Inner Tube** with Two Concentric Inflatable Compartments. R. F. Wilson and W. L. Klingman, assignors to Firestone Tire & Rubber Co., both of Akron, O.

2,237,316. **Shaft Bearing Structure** with Elastic Anti-Skid Tread Portion. R. J. Ruths, Baltimore, Md.

2,237,318. **Direct Acting Friction Shock Absorber.** I. R. Snyder, assignor to Thompson Products, Inc., both of Cleveland, O.

2,237,319. **Shock Absorber and Mounting Therefor.** J. R. Snider, assignor to Thompson Products, Inc., both of Cleveland, O.

2,237,475. **Cellular Rubber Seat Cushion.** F. O. Church, assignor to Dunlop Tire & Rubber Corp., both of Buffalo, N. Y.

2,237,490. **Hose Nipple Connection.** T. M. Knowland, Belmont, assignor to Boston Woven Hose & Rubber Co., Cambridge, both in Mass.

2,237,494. **Seal** for Refrigerating Apparatus with Rubber Washer. A. A. McCormack, assignor to General Motors Corp., both of Dayton, O.

2,237,546. **Interlocking Sink Stopper.** E. Butt, Brooklyn, N. Y.

2,237,559. **Tire Inflating Device** with Rubber Conduit. A. A. Jenne, Topsfield, Mass.

2,237,575. **Resilient Torsion Spring Suspension** for Vehicles. O. F. Quartullo, Shaker Heights, O.

2,237,599. **Football Dummy** with Inflatable Member. M. J. Gilman, Gilman, Conn.

2,237,680. **Water Well Cap** with Resilient Packer. H. R. Mark, Evanston, assignor to Clayton Mark & Co., Chicago, both in Ill.

2,237,751. **Hollow Rubber Image** for Making Animated Moving Pictures. L. Bunin, New York, N. Y.

2,237,758. **Fluid Seal Construction.** C. Kurzweil, assignor to Baldwin Rubber Co., both of Pontiac, Mich.

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2,237,847. **Porous Cosmetic Applicator.** E. J. Smith, Elyria, O.

2,237,862. **Sanitary Suction Eyecup.** P. B. Burhans, Fort Myers, Fla.

2,237,864. **Inflatable Clutch or the Like.** T. L. Fawick, Akron, O.

2,237,942. **Ringlet Curler.** Z. Lemley, Denver, Colo.

2,237,952. **Leakproof Cover and Ring Seal.** C. F. Smith, Martins Ferry, O.

2,237,984. **Cleaning and Fumigating Device** with Distortable Hollow Element. A. B. Frame, Kirn, Scotland, and W. J. Frame, London, England.

2,237,986. **Ball Game.** C. F. Gilford, Concord, N. H.

2,237,994. **Thread Reeling Device** with Rubber Engaging Member. F. F. Long, Chester, assignor to American Viscose Corp., Marcus Hook, both in Pa.

2,238,002. **Rubber Cushion Seat** for Trailer Axles. R. W. Pointer, assignor of one-half to Willamette Iron & Steel Corp., both of Portland, Oreg.

2,238,175. **Wallpaper Remover** Including a Sponge Rubber Block. A. Kendechy, Cleveland, O.

2,238,187. **Automobile Window Shield.** I. Sanchez, St. Augustine, Fla.

2,238,197. **Bearing Structure** of Latex-Impregnated Fibrous Material. J. W. Watson, Wayne, assignor to John Warren Watson Co., Philadelphia, both in Pa.

2,238,214. **Fountain Pen.** K. Dole, Melrose, Mass.

2,238,216. **Rubber-Covered Fabric Tire Anti-Skid Device.** E. Eger, Grosse Pointe Park, Mich., assignor, by mesne assignments, to United States Rubber Co., New York, N. Y.

2,238,337. **Shoe Stiffener Composition** Comprising Rubber, Resin-Containing Box Toe Scrap, Cumarone Resin, and Asbestos Fiber. H. S. Miller, Quincy, Mass., assignor to Beckwith Mfg. Co., Dover, N. H.

2,238,342. **Heat Sealing Rubber Hydrochloride Films on Packages.** T. A. Riehl, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

2,238,353. **Elastic Fabric.** S. Weintraub, Hillside, and J. A. Martin, Elizabeth, both in N. J., assignors to Flexnit Co., Inc., a corporation of N. J.

2,238,377. **Undercutter with Rubber Block.** E. S. Strang, Long Beach, Calif.

2,238,435. **Bearing Bushing** of Elastic Material. W. R. Perry, assignor to Reeves Pulley Co., both of Columbus, Ind.

2,238,477. **Golf Rubber Overshoe** with Spikes. G. E. Murber, Fairfax, Calif.

2,238,492. **Respirator Mask.** C. W. Leguillon, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,238,531. **Resilient Shaft Coupling** Utilizing Cylindrical Rubber Blocks. N. G. A. Malmquist, Malmö, Sweden.

Dominion of Canada

395,714. **Rubber Plug-In Battery Closure.** Burgess Battery Co., Chicago, Ill., assignee of Burgess Battery Co., Madison, Wis., assignee of H. W. Porth, Freeport, Ill., all in the U. S. A.

395,727. **Endless Belt** of Resilient Material with a Flexible Metal Mesh Member Embedded Therein to Provide for Connection of Free Ends. Dayton Rubber Mfg. Co., assignee of A. L. Freedlander, both of Dayton, O., U. S. A.

395,743. **Railway Car** with Rubber Vibration-Absorbing Parts. Lord Mfg. Co., assignee of H. C. Lord, both of Erie, Pa., U. S. A.

395,761. **Golf Club Grip,** Including a Molded Tubular Rubber-Like Body with Finely Divided Short Fibers Dispersed Therein. A. G. Spalding & Bros. of Canada, Ltd., Brantford, Ont., assignee of J. B. Dickson, Northampton, Mass., U. S. A.

395,778. **Fluidtight Packing Member** with Rubber Lining. E. Freyssinet, Neuilly-sur-Seine, France.

395,781. **Road Marking Device** Comprising a One-Piece Strip-Like Body of Extruded Rubber. E. L. Gethin, Morden, and G. D. Worthington, Kingston, co-inventors, both in Surrey, England.

395,785. **Foundation Garment.** L. J. A. Amyot, Quebec P. Q.

395,797. **Confection Wrapped with Rubber Hydrohalide Film.** Stretched beyond Its Normal Position and Sealed by Heat and Pressure. O. J. Kuhlke, Akron, O., U. S. A.

395,809. **Brush Finger Tip Device** with Rubber Body. W. A. Sleeper, Los Angeles, Calif., U. S. A.

395,824. **Respirator.** American Optical Co., South Bridge, assignee of W. H. Leinberg, Dudley, both in Mass., U. S. A.

395,860. **Earth Boring Drill Sleeve Protector** of Rubber. Leyland & Birmingham Rubber Co., Ltd., assignee of H. J. Butcher and R. W. Lunn, co-inventors, all of Leyland, Lancashire, England.

395,861. **Gasket Composition** of Rubber Hydrochloride, Asbestos, and a Basic Heat Stabilizer Comprising an Alkaline Earth Metal Oxide and Litharge. Marbon Corp., Gary, Ind., assignee of H. A. Winkelmann, Chicago, Ill., both in the U. S. A.

395,864. **Non-Skid Shoe Sole** with Closely Spaced Zig-Zag Ribs. Miner Rubber Co., Ltd., assignee of N. A. Austin, both of Granby, P. Q.

395,925. **Rubber Scalp Protector** for Permanent Waving Hair. B. Morea, Flushing, and J. F. Hennessy, Valley Stream, co-inventors, both in L. I., N. Y., U. S. A.

396,122. **Electric Plug** with a One-Piece Molded Resilient Plug Body. N. Chirelstein, Chicago, Ill., U. S. A.

396,170. **Electric Vibrator.** Automatic Instrument Co., assignee of L. J. Andres, both of Chicago, Ill., U. S. A.

396,187. **V-Belt** with Semi-Cylindrical Grooves in Underside of Belt. Dayton Rubber Mfg. Co., assignee of A. L. Freedlander, both of Dayton, O., U. S. A.

396,249. **Resilient Shaft Coupling** Utilizing Cylindrical Short Rubber Blocks. Svenska Aktiebolaget Bromsregulator, assignee of N. G. A. Malmquist, both of Malmö, Sweden.

396,272. **Textile Plant Conveyer** Comprising a Pneumatic-Tired Wheel, one Part of the Periphery of Which Is Transversed by a Belt with Which Pressure Rollers Cooperate. Automatic Flax Production Units, Courtrai, assignee of M. A. Soenens, Harelbeke, both in Belgium.

396,279. **Resilient Airplane Propeller Suspension.** M. F. A. Julien and Y. A. Rocard, co-inventors, both of Paris, France.

United Kingdom

534,332. **Rubber Spring Buffers, Fenders, Shock-Absorbers, Traction Hooks, Suspensions, Etc.,** for Road and Railway Vehicles, and Rubber Spring Appliances Forming Part of Machine Constructions. Soc. Italiana Pirelli.

534,404. **Rubber Heels.** J. Coggans.

534,464. **Electrical Insulating Material.** Standard Telephones & Cables, Ltd., and J. F. Morley.

534,511. **Windshield Wipers.** Trico Products Corp.

534,530. **Shock-Reducing and Cushioning-Wheel Mounting** for Vehicles. G. L. Larison.

534,661. **Coverings of Insulated Electric Conductors.** Liverpool Electric Cable Co., Ltd., R. F. D. Milner, and L. T. Reynolds.

534,789. **Flexible Hoses.** Automotive Products Co., Ltd., and G. R. G. Gates.

534,808. **Windshield Wipers.** Trico Products Corp.

534,907. **Wringers.** British Thomson-Houston Co., Ltd., and K. M. Mackay.

534,920. **Braking Mechanism.** Firestone Tire & Rubber Co., Ltd.

534,959. **Electric Insulation Materials.** British Thomson-Houston Co., Ltd., (Tokyo Shibaura Denki Kabushiki Kaisha.).

535,095. **Resilient Mountings** for Fixed and Mobile Machinery. Soc. Italiana Pirelli.

535,096. **Springs** Comprising Rubber Parts Interposed between Metal and Subjected Principally to Shear-Flexion Stresses. Soc. Italiana Pirelli.

535,113. **Electric Cables.** Pirelli-General Cable Works, Ltd., and R. E. S. Soper.

535,164. **Pneumatic Tire.** United States Rubber Co.

535,167. **Foundation Garments.** R. & W. H. Symington & Co., Ltd., Stapley & Smith, Ltd., and S. Pace.

PROCESS

United States

2,238,798. **Ribbed Tubes.** R. Lenk, Vienna, Austria, assignor to K. Lenk, Worcester, Mass.

2,238,885. **Process of Making Multiform Rubber Thread** Comprising the Continuous Drawing of More Than Two Freshly Coagulated Rubber Filaments up through a Liquid Bath Whereby the Filaments Are Brought into Close Contact by the Surface Tension of the Liquid. R. G. James and S. F. Smith, both of Wylde Green, Birmingham, assignors to Dunlop Rubber Co., Ltd., London, all in England.

2,239,635. **Production of an Endless Band of Continuous Cords** Which Comprises Leading an End of Cord Successively about a Pair of Spaced Rotatable Surfaces to Form a Com-

plete Loop, Fastening the Leading End of the Cord, Rotating Said Surfaces to Draw Successive Lengths of Cord into Contiguous Loops to Form a Flat Band, Covering It with a Layer of Rubber, and Pressing Rubber into Inter-Engagement with the Loops of the Bands. W. R. Walton, Jr., assignor to Dunlop Tire & Rubber Goods Co., Ltd., both of Toronto, Ont., Canada.

2,240,415. **Sponge Rubber** Having Uniformly Distributed Microscopic Cells Containing Water Having a Hygroscopic Agent Incorporated Therein, in an Amount Which Will Retain the Water in the Sponge Rubber But Will Not Absorb Water Out of the Atmosphere, Whereby the Sponge Rubber Possesses a Dry Surface. P. G. Peik, Detroit, Mich., assignor to Emulsions Process Corp., New York, N. Y.

2,240,805. **Adhesively Vulcanizing Rubber** to a Metallic Cobalt Surface by Means of Heat and Pressure. W. L. Semon, Silver Lake, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,240,862. **Method of Adhering Rubber** to a Brass Surface, Which Comprises Covering the Brass with a Thin, Continuous Film Consisting Essentially of Sulphur, Superposing the Rubber, and Subjecting the Assemblage to Heat and Pressure. J. W. Schade, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

Dominion of Canada

394,928. **Rubber Thread of High Modulus,** Which Comprises Extruding Aqueous Compounded Dispersion of Rubber into a Coagulant to Form a Thread, Stretching the Thread, Drying at about 80° C., and Vulcanizing below 65° C. (Latex.) T. L. Shepherd, London, England.

396,067. **Wax Treatment of Rubber-Sheathed Electrical Cable**—Comprising Application of an Emulsion of Paraffin in Water, Removing Excess Emulsion and Drying Out Moisture, the Application of Emulsion and Removal of Excess Being Carried Out Cold to Obtain Minimum Absorption of Paraffin by Rubber. Western Electric Co., Inc., New York, N. Y., U. S. A., assignee of S. R. McDougall, Hampstead, P. Q.

United Kingdom

534,278. **Articles from an Aqueous Rubber Dispersion.** Dewey & Almy, Ltd., (Dewey & Almy Chemical Co.).

534,602. **Rubber Goods Manufacture.** International Latex Processes, Ltd.

534,842. **Air-Space Electric Communication Cables.** Standard Telephone & Cables, Ltd.

534,928. **Electric Cables.** Bergmann-Elektricitats-Werke, A.G.

535,154. **Composite Material** for Use as Leather Substitute. International Latex Processes, Ltd.

MACHINERY

United States

2,238,119. **Ball Covering Machine.** A. F. Larabee, Greensburg, Pa., assignor to Pennsylvania Rubber Co., a corporation of Pa.

2,238,534. **Apparatus for Manufacturing Contoured Sheets** from Vulcanizable Material. A. McDonald, assignor to Baldwin Rubber Co., both of Pontiac, Mich.

2,238,539. **Pressure Tester.** D. C. Scott, Providence, R. I., assignor to Henry L. Scott Co., a corporation of R. I.

2,238,825. **Tire Repair Vulcanizer.** C. M. Semler, Cuyahoga Falls, O.

2,238,833. **Apparatus and Method for Producing Dipped Articles.** N. E. Tillotson, Watertown, Mass.

2,239,453. **Tire Building Apparatus** Comprising a Rotary Form and a Pair of Coacting Fabric-Pressing Rollers. H. C. Bostwick, Coventry Township, assignor to Akron Standard Mold Co., Akron, both in O.

2,240,010. **Vulcanizer** with Fluid Pressure to Raise Cover. G. P. Bosomworth, assignor to Firestone Tire & Rubber Co., both of Akron, O.

2,240,251. **Vulcanizer** Including a Rotary Vulcanizing Drum and a Cooperating Tension Band. W. J. Baker, West Somerville, and W. C. Bleher, West Roxbury, assignors to Boston Woven Hose & Rubber Co., Cambridge, all in Mass.

2,240,382. **Tire Regroover.** R. I. Van Alstine, Philadelphia, Pa.

2,240,505. **Apparatus and Method for Fatigue Testing Filamentary Articles** Such as Tire Cord. E. T. Lessig, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,240,618. **Polymerizing Apparatus.** J. C. Harris, Jr. and G. Sutherland, both of Baltimore, Md.

2,240,926. **Hydraulic Press.** R. W. Dinzl, Westfield, assignor to Watson-Stillman Co., Roselle, both of N. J.

Dominion of Canada

395,728. **Abrasive Machine** for Rolls. Dayton Rubber Mfg. Co., assignee of N. J. Ritzert, both of Dayton, O., U. S. A.

395,729. **Hydraulic Press.** Dominion Engineering Works, Ltd., Lachine, assignee of J. H. Maude Verdun, both in P. Q.

395,769. **Web Bias Cutter Control Means** Including an Electric Eye Mechanism for Detecting When the Sheet Is Improperly Positioned. Wingfoot Corp., assignee of B. J. Beitman, both of Akron, O., U. S. A.

395,845. **Tire Shaping and Bagging Machine.** Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., assignee of H. Willshaw and H. Smith, co-inventors, both of Birmingham, Warwickshire, England.

396,192. **Apparatus to Produce an Endless Band** of Cords Embedded in Rubber. Dunlop Tire & Rubber Goods Co. Ltd., assignee of W. R. Walton, Jr., both of Toronto, Ont.

United Kingdom

534,380. **Apparatus and Method for Preparing and Handling Rubber Material.** United States Rubber Co.

534,392. **Dies for Molding Rubber.** N. Straussler.

CHEMICAL

United States

2,238,141. **Stabilizing Composite Articles of Cellulose Material and Neoprene** by Adding Fluorides Which Will React with Any Hydrochloric Acid Evolved from Neoprene. (Synthetic.) H. W. Walker, Woodstown, N. J., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,238,320. **Preparing Secondary Amines** by Reacting Hydroquinone with a Primary Aromatic Amine in the Presence of Phosphoric Acid. A. F. Hardman, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

2,238,331. **Vulcanizing Rubber** in the Presence of a Reaction Product of Formaldehyde, Hydrochloric Acid, and an Alkali Metal Salt of a Dithiocarbamic Acid. J. G. Lighty, Stow, O., assignor to Wingfoot Corp., Wilmington, Del.

2,238,336. **Condensation Derivative of Rubber** Produced by Treating Rubber in Solution with Boron Fluoride, Pouring into Water Which Contains Sodium Stearate, Emulsifying, Adding a Zinc Salt to Convert the Sodium Stearate to Zinc Stearate, and Then Volatilizing the Solvent to Precipitate the Condensation Derivative. T. C. Morris, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

2,238,975. **Plastic Composition** Made by Adjusting the Hydrogen Ion Concentration of Rubber Latex to a Value between 11.1 and 11.4 pH and Then Mixing Therewith Aluminous Cement or Portland Cement to Form a Pasty Mass. J. T. K. Crossfield, Brooklyn, N. Y.

2,239,659. **Art of Treating Rubber** Which Comprises Mixing Rubber and Carbon Black, Heat Treating the Mixture at Such Temperatures and for a Sufficient Time to Cause Stiffening, Adding Zinc Oxide, an Accelerator, and Sulphur, and Thereafter Milling the Mixture and Vulcanizing. H. P. Bradley, Cuyahoga Falls, assignor to Firestone Tire & Rubber Co., Akron, both in O.

2,240,038. **Resilient Rubber-Like Solid Mass Which Can Be Comminuted,** Produced by Mixing Cashew Nut Shell Liquid with 1% to 10% Mineral Acid Polymerizing Agent and Heating. M. T. Harvey, East Orange, and F. M. Damitz, Millburn, both in N. J., assignors, by direct and mesne assignments, to Harvel Corp., a corporation of N. J.

2,241,340. **A Composition of Hydrogenated Coumarone-Indene Resin,** from about 1% to 40% of a Rubber-Like Isobutylene Polymer, and a Solvent. W. H. Carmody, assignor to Neville Co., both of Pittsburgh, Pa.

Dominion of Canada

395,758. **Production of Vinyl Chloride** by Treating Ethylene Dichloride with an Aqueous Solution of Sodium Phosphate under Pressure and above 140° C. and Maintaining pH from 6 to 12. Shell Development Co., San Francisco, Calif., assignee of J. D. Ruys and H. R. McCombie, co-inventors, both of Pittsburgh, Pa., all in the U. S. A.

395,768. **Carbon Sulfo Selenide Preparation**—Reacting Hydrogen Selenide with an Aryl Isothiocyanate or an Aryl Thiourea. Wingfoot Corp., Akron, O., assignee of W. Scott, both of Akron, O., U. S. A.

395,844. **Process for Vulcanizing a Composition of/or Containing Rubber, Gutta Percha, or Balata** with an Accelerator or Accelerators Containing the Atomic Grouping .C(:S).S. Characterized by Effecting Vulcanization in the Presence of Carbon Disulphide. Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., assignee of D. F. Twiss and J. Moore, co-inventors, both of Birmingham, Warwickshire, England.

396,190. **Antioxidant Manufacture**—Method of Producing a Pulverizable Solid Aliphatic Ketone-Diarylamine. Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of C. S. Dewey, Cheshire, Conn., U. S. A.

UNCLASSIFIED

United States

2,238,045. **Hydraulic Pressure Transmitting Fluid.** R. R. Fulton, Pittsburgh, Pa., assignor, by mesne assignments, to Puritan Co., Inc., Rochester, N. Y.

2,238,303. **Bias Cutter Control Means** Including an Electric Eye Mechanism for Detecting When Sheet Is Improperly Positioned. B. J. Beitman, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

2,238,700. **Convertible Bulkhead** for Refrigerator Cars. J. S. Lundvall, assignor to Union Asbestos & Rubber Co., both of Chicago, Ill.

2,239,281. **Heat Insulating Tape.** W. F. Astley, Cicero, assignor to Union Asbestos & Rubber Co., Chicago, both in Ill.

2,239,293. **Insulating Tape.** C. Mosier and J. L. Mohun, Jr., both of Chicago, Ill., assignors to Union Asbestos & Rubber Co.

2,239,457. **Fire Repellent Pile Fabric.** W. A. Gibbons, Montclair, N. J., assignor to United States Rubber Co., New York, N. Y.

2,239,463. **Wheel and Rim.** B. L. Mills, Buchanan, Mich., assignor, by mesne assignments, to Wingfoot Corp., Wilmington, Del.

2,239,504. **Wheel Rim** for Pneumatic Tires. R. H. Lewis, Chicago, Ill.

2,239,514. **Machine and Method of Weaving Insulation.** W. F. Astley, Cicero, assignor to Union Asbestos & Rubber Co., Chicago, Ill.

2,239,622. **Railway Refrigerator Car.** A. F. O'Connor, assignor to Union Asbestos & Rubber Co., both of Chicago, Ill.

2,239,676. **Air Pressure Signaling Device.** H. G. Henry, King City, Calif.

2,239,755. **Insulated Wire Strippers.** R. J. Montgomery, Chicago, Ill.

2,240,058. **Electrical Conductor Core** with Knitted Covering Formed of Interconnected Wales, Certain of Which Are Unevenly Spaced to Form an Identifying Portion. C. N. Stover, Baltimore, Md., assignor to Western Electric Co., Inc., New York, N. Y.

2,240,129. **Inner Tube Valve.** L. C. Broecker, assignor to Bridgeport Brass Co., both of Bridgeport, Conn.

2,240,261. **Traction Device for Tractor Tires.** F. G. Hodeli, Gates Mills, assignor to Hodell Chain Co., Cleveland, both in O.

2,241,198. **Warning Valve** for Flat Tires. M. Glowka, New York, N. Y.

2,241,366. **Refrigerator Car Construction.** A. F. O'Connor, Chicago, and G. A. Hull, Highland Park, assignors to Union Asbestos & Rubber Co., Chicago, all in Ill.

Dominion of Canada

395,757. **Knitting Machine** for Covering Elastic Thread. Scott & Williams, Inc., Laconia, N. H., assignee of J. Lawson, Bristol Highlands, R. I., both in the U. S. A.

395,999. **Vulcanizer Clamp and Electrically Heated Vulcanizing Unit.** Dill Mfg. Co., Cleveland, assignee of J. C. Crowley, Cleveland Heights, both in O., U. S. A.

396,000. **Tire Heat Treating Apparatus** Including Means for Imparting Tension Strains to the Regions at the Bases of the Tread Grooves and Means for Intensively Heating the Extended Area of the Tread. Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of M. Bailey, Detroit, Mich., U. S. A.

396,036. **Electrical Insulating Material** Comprising Fibrous Tape Impregnated with Polystyrene. Northern Electric Co., Ltd., Montreal, P. Q., assignee of J. K. Webb, London, England.

United Kingdom

534,355. **Wheel Construction.** Firestone Tire & Rubber Co., Ltd.

534,985 and 535,006. **Joints or Terminating Devices** for Coaxial Conductor Electric Cables. Pirelli-General Cable Works, Ltd., and R. E. S. Soper.

TRADE MARKS

United States

348,553. **"Blair's" Health-Ade.** Abdominal belts Blair Corset Co., Inc., Chicago, Ill.

348,848. **"Flat-E-Fect."** Foundation garments Maidwell Brassiere & Corset Co., New York N. Y.

348,863. **Whipcord.** Hose and belting. Raybestos-Manhattan, Inc., Passaic, N. J.
348,877. **Chamois Crepe.** Clothing, suspenders, and garters. Knothe Bros. Co., Inc., New York, N. Y.
349,425. **Kool-Kord.** Tires. Goodyear Tire & Rubber Co., Akron, O.
349,743. **Tred-Made.** Footwear. M. J. Saks Shoe Corp., New York, N. Y.
349,744. **Bras-Band.** Foundation garments. Lewel Mfg. Co., Inc., New York, N. Y.
349,745. **Hold-Up.** Foundation garments. Lewel Mfg. Co., Inc., New York, N. Y.
349,881. **Martin.** Denture rubber, etc. Martin Rubber Co., Inc., Long Branch, N. J.
350,144. **Croydon.** Tires and tubes. Sam Schwartz Co., Inc., New Haven, Conn.
350,342. **St. Andrews.** Golf balls. Kasselberg-Griffith Corp., Chicago, Ill.
350,613. **Bragilet.** Foundation garments. Dorothea Doctors, Inc., New York, N. Y., assignor to Dorothea Doctors, New York, N. Y., a firm composed of D. Doctors and S. A. Fox.
350,630. Representation of a black bar containing the words: **"Fashions Afoot"** in white, below the word: **"Goodyear."** Footwear. Phillips-Baker Rubber Co., Providence, R. I., assignor to Goodyear Footwear Corp., a corporation of Del.
350,843. Representation of two concentric ovals containing the words: **"Dickerson's Insulated Kushin-Tread."** Shoes. Walker T. Dickerson Co., Columbus, O.
351,016. **American Brakeblok.** Fan belts, hose, generator couplings. American Brakeblok Corp., New York, N. Y.
351,017. Representation of a rectangle containing the words: **"American Brakeblok."** American Brakeblok Corp., New York, N. Y.
351,022. **Farm Lug.** Tires. Atlas Supply Co., Newark, N. J.
351,035. **Nautical Togs.** Clothing, foundation garments and hosiery. Greenhill & Daniel, Inc., Brooklyn, N. Y.
351,432. **Kable Kord.** Belting. L. H. Gilmer Co., Tacony, Philadelphia, Pa.
351,716. **Tuffball.** Golf balls. Worthington Ball Co., Elyria, O.
351,872. **Mid-rip.** Wires and cables. General Cable Corp., New York, N. Y.
351,873. **Maiden Form.** Girdles, etc. Maiden Form Brassiere Co., Inc., New York, N. Y.
351,883. **Mold Form.** Girdles, etc. Mold Form Brassiere, Inc., New York, N. Y.
351,898. **Crackerjacks.** Suspenders. Gluckauf Co., Inc., New York, N. Y.
351,905. **Windsor.** Rubber heels, taps, and soles. Hagerstown Rubber Co., Hagerstown, Md.
352,535. Representation of an octagon containing the words: **"Edgeworth Fine Shoes Since 1870."** Footwear. J. H. Gilbert, South Bend, Ind.
352,724. **Glenfield.** Footwear. Ludwig Baumann & Co., New York, N. Y.
352,733. **Browning, King.** Clothing, shoes, accessories. Browning King & Co. of New York, Inc., Brooklyn, N. Y.
353,308. Representation of a rectangle containing the words: **"Tuff Tred."** Strip rubber for tire manufacture and repair. Oliver Tire & Rubber Co., Oakland, Calif.
353,701. **Sport-back.** Suspenders. Condor Products, Inc., Buffalo, N. Y.
353,707. **Windsor Hickok.** Garters, braces, etc. Hickok Mfg. Co., Inc., Rochester, N. Y.
353,896. **Harry Cotter.** Clothing accessories, including garters, armbands, etc. H. Cotter, New York, N. Y.
354,396. **Standard Gum-Dipped.** Tires. Firestone Tire & Rubber Co., Akron, O.
354,397. **Pullman.** Tire repair materials. Pullman Chemical Co., Camden, N. J.
354,410. **Daytonian.** Tires. Dayton Rubber Mfg. Co., Dayton, O.
354,851. **Ten-Edge.** Windshield wipers and parts thereof. Anderson Co., Gary, Ind.
354,852. **Hook-Up.** Windshield wipers and parts thereof. Anderson Co., Gary, Ind.
354,995. **Shuprotek.** Elastic shoe mitts. F. D. Gamble, Los Angeles, Calif.
355,007. **Browning, King & Co.** Clothing, shoes, and accessories. Browning, King & Co. of New York, Inc., New York, N. Y.
355,486. **Better Bicking Copy Company.** Stationer's supplies, including erasers and rubber bands. H. Bicking, doing business as Henry Bicking Co., New York, N. Y.
355,670. **Armor Tread.** Tires and tire retreads. Armor Tread Tire Corp., Curtis Bay, Baltimore, Md.
355,798. **Launderite.** Dress shields. I. B. Kleinert Rubber Co., New York, N. Y.
356,862. **Bach.** Pessaries. R. A. Bachmann, doing business as Bach Pessalator Co., New York, N. Y.
357,234. **Hi-Grader.** Belting. Lee Rubber & Tire Corp., Youngstown, O.
357,235. **Luxor.** Rubber cement. B. K. Elliott Co., Pittsburgh, Pa.
357,633. **Greyhound.** Garters, etc. H. Englander, Philadelphia, Pa.
357,643. **Peerless.** Trusses. Brooks Appliance Co., Marshall, Mich.
357,650. Representation of a label containing the words: **"Forman Custom Bilt."** Shoes. Cart Shoes, Inc., Cleveland, O.
357,655. **Saks New York.** Footwear. M. J. Saks Shoe Corp., New York, N. Y.
357,660. **Ansonia.** Footwear. Ansonia De Luxe Shops, Inc., New York, N. Y.
357,661. **Bill Thompson.** Golf equipment. Chicago Golf Ball Co., Inc., Chicago, Ill.
357,662. **Nome.** Footwear. J. C. Penney Co., Wilmington, Del.
358,985. **NevaStane.** Footwear. Woodstock Rubber Co., Ltd., Woodstock, Ont., Canada.
358,990. **Famous Fashion Shops.** Clothing. Famous Fashion Shop, Inc., Astoria, N. Y.
358,994. **Beauty Mode.** Shoes. Edison Bros. Stores, Inc., St. Louis, Mo.
358,996. **Jean Sutton.** Shoes, clothing, and accessories. Wm. T. Knott Co., Inc., New York, N. Y.
358,999. **ShuGor.** Elastic inserts in footwear. Thomas Taylor & Sons, Inc., Hudson, Mass.
359,314. **Store Service.** Tires. Federal Rubber Co., Chicopee Falls, Mass.
359,319. **Lorraine.** Bath sponges, etc. Glemby Co., Inc., New York, N. Y.
359,422. **Fix the casing, too.** Tire and casing materials. Bowes "Seal-Fast" Corp., Indianapolis, Ind.
359,643. **But-N-On.** Dress shields. Atrea Mfg. Co., New York, N. Y.
360,387. **Brentwood Levy Bros.** Clothing. Levy Bros. of Elizabeth, N. J., Inc., Elizabeth, N. J.
360,396. **Grip-Tite.** Suspenders, etc. Swank Products, Inc., Attleboro, Mass.
360,406. Representation of a label containing the words: **"Belmar Combination Last Arch Support."** Shoes. Cort Shoes, Inc., Cleveland, O.
360,407. Representation of a label containing the words: **"Dexter Combination Last Arch Support."** Shoes. Cort Shoes, Inc., Cleveland, O.
360,408. Representation of a label containing the words: **"Kingston 'De-Luxe Footwear.'"** Shoes. Cort Shoes, Inc., Cleveland, O.
360,417. Representation of a gloved hand gripping a rod, and the words: **"Easy Grip Safety Cuff Rubberized-Waterproof."** Gloves. Toledo Mfg. Co., Toledo, O.
360,684. Representation of a scrolled parchment containing the words: **"The 'Morley' Shoe."** Shoes. Cort Shoes, Inc., Cleveland, O.
360,691. **Kapelet.** Make-up and shampoo capes. I. B. Kleinert Rubber Co., New York, N. Y.
360,705. **Corky.** Gaskets and washers. Armstrong Cork Products Co., Lancaster, Pa.
361,543. **Lee of Conshohocken.** Tire, tubes, repair kits, footwear, hose, gaskets, tubing. Lee Rubber & Tire Corp., Conshohocken, Pa.
361,544. **S'porters.** Abdominal supporters. I. B. Kleinert Rubber Co., New York, N. Y.
361,550. Representation of two footprints, each containing obtuse triangles, circles cutting the angles of the triangles, and the words: **"Propellor", "Weight Bearer",** and **"Springer"** on the sides of the triangles; the footprints between the words: **"Three Point Balance 'Natural Walk Shoes.'"** Shoes. J. R. Bettzer, New York, N. Y.
361,711. **Tissu-Weight.** Dress shields. I. B. Kleinert Rubber Co., New York, N. Y.
362,479. **Lady Madison.** Foundation garments. Gem-Dandy Garter Co., Madison, N. C.
362,489. **Toe-Saver.** Boots. Goodall Rubber Co., Inc., Philadelphia, Pa.
362,495. **Stout Control.** Foundation garments. H. J. Dubner, doing business as Stout Control Foundations, New York, N. Y.
362,497. **Kaufmann's Carnegie Twist Pittsburgh.** Clothing, shoes, and accessories. Kaufmann Department Stores, Inc., Pittsburgh, Pa.
362,498. Representation of an oval containing the words: **"Snug Ankle."** Shoes. Commonwealth Shoe & Leather Co., Whitman, Mass.
362,510. **Hattie Carnegie.** Wearing apparel. Hattie Carnegie, Inc., New York, N. Y.
362,511. **C. H. Martin.** Shoes. M. Kleinfeld, doing business as Kay Shoe Co., New York, N. Y.
362,513. **Lady Washington.** Corsets. Kresge Dept. Stores, Inc., Newark, N. J.
362,644. **Bracer.** Abdominal supporters, etc. Kendall Co., Chicago, Ill.
362,651. **American Brakeblok.** Frictional elements, fan belts, hose, etc. American Brake Shoe & Foundry Co., New York, N. Y.
363,395. **Dunbar.** Golf balls. R. DeSalvo, New York, N. Y.
363,935. **All Weather.** Heels and soles. Goodyear Tire & Rubber Co., Akron, O.
363,947. **Mexicana Modes.** Shoes. Edison Bros. Stores, Inc., St. Louis, Mo.
363,948. **Warwick.** Wearing apparel, including suspenders, etc. Higginbotham-Bailey-Logan Co., Dallas, Tex.
363,951. **Firmsette.** Reducing bands. C. M. Burman, New York, N. Y.
363,952. **It Must Be Right!** Wires, cables, and fittings. Triangle Conduit & Cable Co., Inc., New York, N. Y.
364,137. **Orthovogue.** Shoes. W. Wagenseil, Brooklyn, N. Y.
364,145. **Saft-T-Skin.** Prophylactics. Gotham Sales Co., Inc., New York, N. Y.
364,162. **Longwear.** Golf balls. New Process Co., Warren, Pa.
364,671. **Norwalk.** Tires, tubes, and accessories. Norwalk Tire & Rubber Co., Norwalk, Conn.
365,285. Representation of a label in Ben Day containing the words: **"Convertible CC Five Ply Bead to Bead Custom Craft"** in white, above a white rectangular space. Tires. Norwalk Tire & Rubber Co., Norwalk, Conn.
365,477. **Fashion-Bilt.** Shoes. Fashion - Bilt Shoe Co., Pontiac, Ill.
365,483. Representation of a black circle containing the words: **'Use Howards' Time-Pay Plan!"** in white. Footwear and clothing Dailey's Style Shop, Inc., New York, N. Y.
365,485. **"Polly Tucker."** Clothing, shoes, etc. Bonwit Teller, Inc., New York, N. Y.
365,512. **Napwite.** Shoes. Dr. A. Posner Shoes, Inc., New York, N. Y.
365,517. **Fashion Form.** Foundation garments. Aurora Corset Co., Aurora, Ill.
365,518. **Kool-Wear.** Clothing, shoes, rubber gloves, etc. Blossom Products Corp., Allentown, Pa.
365,766. **Manhattan.** Combs. American Hard Rubber Co., New York, N. Y.
366,135. **Joan Eddy.** Wearing apparel. Lerner's Vogue Shops, Kansas City, Mo.
366,498. **Vee-lok.** Clutch facings. Raybestos-Manhattan, Inc., Passaic, N. J.
366,508. **Bowes Seal Fast.** Tire and tube repair kits, fan belts, and hose. Bowes "Seal-Fast" Corp., Indianapolis, Ind.
366,609. **Dayton.** Cog belts. Dayton Rubber Mfg. Co., Dayton, O.
366,940. **Kamper.** Soles. Panther-Panco Rubber Co., Inc., Chelsea, Mass.
366,948. **Drywear.** Baby pants, bibs, and bathing caps. Seiberling Latex Products Co., Barberton, O.
366,958. **Perfek -Pump-.** Shoes. Saks & Co., New York, N. Y.
366,959. **Surety Turn-Cuff.** Gloves. Surety Rubber Co., Carrollton, O.
366,966. **Slax . . . .** Shoes. Commonwealth Shoe & Leather Co., Whitman, Mass.
366,967. **Stasnug.** Foundation garments. Imperial Mfg. Co., New York, N. Y.
366,968. **Stanzoil.** Gloves. Pioneer Rubber Co., Willard, O.
366,969. **Model Shoo.** Shoes. Saks & Co., New York, N. Y.
366,972. **Bust Mold Specialized Sizing.** Foundation garments. Mold Form Brassiere, Inc., New York, N. Y.
368,150. **Fontaine.** Clothing. Union Co., Columbus, O.
368,151. **"Yoursize."** Girdles. Gem-Dandy Garter Co., Madison, N. C.
368,154. **Barrie, Ltd.** Footwear. Harry's Shoe Store, Inc., New Haven, Conn.
368,159. **Parkhill Flexibles.** Footwear. Comfort Slipper Corp., Boston, Mass.
368,163. **Logan Health Garment.** Corsets, etc. Logan Health Garment Co., Chicago, Ill.
368,177. **Tom Collins.** Shoes. Bleecker Shoe Co., Inc., New York, N. Y.
368,179. **Korod'less.** Battery cables. Bowes "Seal-Fast" Corp., Indianapolis, Ind.
368,194. Representation of a label having two Grecian columns for sides, containing the words: **"Proper-Wauk Corrective Protective Footwear, Brooklyn, N. Y."** Shoes. S. H. Kaplan, New York, N. Y.
368,195. **Safety Grip.** Tires. Western Auto Supply Co., Kansas City, Mo.
368,396. **Sta-On.** Prophylactics. Nutex Co., Philadelphia, Pa.
368,524. **Heeltyte.** Shoes. Walker T. Dickerson Co., Columbus, O.
368,554. **Wyndham.** Clothing, shoes, and accessories. Gimbel Bros., New York, N. Y.
368,946. **Killian.** Prophylactics. Killian Mfg. Co., Akron, O.
368,951. Representation of a label containing the words: **"Custom Craft CC Heavy Duty Tube."** Inner tubes. Norwalk Tire & Rubber Co., Norwalk, Conn.
369,101. **Saf . T.** Bowling alley ball returns and parts thereof. Brunswick-Balke-Collender Co., Chicago, Ill.
369,538. **Weatherproofed.** Tires. United States Rubber Products, Inc., assignor to United States Rubber Co., both of New York, N. Y.
369,833. **The Unit Vital Control.** Foundation garments. Even-Pul Foundations, New York, N. Y.
369,842. **Edith Lances.** Corsets, beachwear, etc. Edith Lances Brassieres, New York, N. Y.
369,850. **Sta-Up-Top.** Girdles. Warner Bros. Co., Bridgeport, Conn.
370,152. **Mademoiselle Roche.** Clothing, etc. I. Richmond, Chicago, Ill.
370,159. **Non-Skid.** Trusses. Ohio Truss Co., Cincinnati, O.
370,357. **Always Stretch.** Elastic fabrics. George C. Moore Co., Westerly, R. I.
370,369. **Moderna.** Wearing apparel, including rubber gloves, etc. Gimbel Bros., Inc., New York, N. Y.
370,373. **Jean Sawyer.** Clothing, shoes, etc. G Fox & Co., Inc., Hartford, Conn.
370,649. **Sterling.** Dress shields. I. B. Kleinert Rubber Co., New York, N. Y.
370,814. **Guardress.** Garment shields. W. Stahl, Chicago, Ill.
371,045. **Borhide.** Shoes. Allen Edmonds Shoe Corp., Belgium, Wis.
371,046. **Skos.** Shoes. Allen Edmonds Shoe Corp., Belgium, Wis.
371,340. **Waterttite.** Wires and cables. Okonite Co., Passaic, N. J.
371,360. **Tender-Mint.** Chewing gum. Clark Bros. Chewing Gum Co., Pittsburgh, Pa.
371,783. Representation of a shoe silhouette containing the word: **"ShuGor."** Elastic gores for footwear. Thomas Taylor & Sons, Inc., Hudson, Mass.
372,057. **Fancy Form.** Foundation garments, etc. D. H. Pupo, New York, N. Y.
372,260. **Pin-it.** Dress shields. I. B. Kleinert Rubber Co., New York, N. Y.

Market Reviews

CRUDE RUBBER

Commodity Exchange

TABULATED WEEK-END CLOSING PRICES ON THE NEW YORK MARKET

Futures	Mar. 29	Apr. 26	May 3	May 10	May 17	May 24
			"New" Standard			
May	22.65	22.90	24.13	24.70	24.55	22.95
June	.....	.....	23.98	24.58	24.47	22.82
July	22.18	22.48	23.83	24.45	24.35	22.70
Sept.	21.70	22.00	23.27	23.95	23.80	22.40
Dec.	21.40	21.68	22.95	23.65	23.36	21.95
Mar.	.....	21.38	22.65	23.30	23.01	21.50
Apr.	.....	.....	.....	22.55	23.20	22.91	21.40
			No. 1 Standard			
May	22.65	22.90	24.13	24.70	24.55	.....
Volume per week (tons)	4,340	4,750	10,910	7,740	5,270	10,540

STRENGTH in rubber futures prices during the early part of May were offset later in the month by a sharp decline. Speculative buying, which was the chief factor in the advance, was curbed when reports from Washington indicated that the Government might impose restrictions against a speculative rise in rubber prices. July futures (new contract), after closing at 23.15¢ per pound on April 30, advanced sharply to close at 24.60¢ on May 12 and then declined to reach 22.70¢ on May 24. Thereafter the market was easy, with July closing at 22.52¢ on May 27.

It is believed that current high prices in the New York market reflect a shortage of trade rubber and the limited amounts arriving for dealer accounts. At the end of 1937, importers and dealers were reported by the Rubber Manufacturers Association to be holding 90,410 tons and at the end of 1940, only 31,818 tons. This declined to 18,895 tons at the end of March, 1941, and to only 9,875 tons at the end of April.

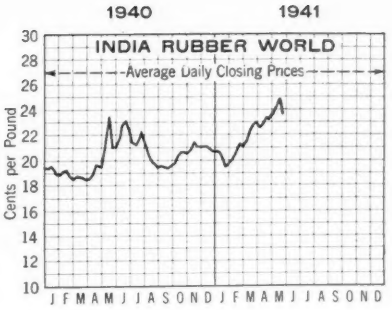
The shipping situation continued to attract attention. Important developments were: reduction of rubber freight rates from the Far East to the Pacific Coast from $27 to $23 per ton; passage by the House of a bill that would give the Maritime Commission authority to exercise a statutory system of cargo priorities on American shipping; appointment of a special committee by the Commodity Exchange to investigate the West Coast warehousing facilities, freight rates, and the general feasibility of handling rubber through Pacific ports; the tentative decision that Pacific Coast deliveries would command a discount of 40 points under the New York delivery price, pending the possible establishment of a new rubber futures contract to include West Coast delivery points; the report that Dutch vessels had already shortened their route by terminating their voyages at the Pacific Coast; and the decision to use Army transports for rubber and other important cargoes: It is generally expected that the bulk of rubber shipments will eventually be made to the West Coast, with transshipment via rail to consuming centers. According to the R.M.A., 25% of April rubber imports were entered at Pacific ports, principally Los Angeles.

The International Rubber Regulation Committee met in London on May 20 and decided to maintain the rubber quota at 100% for the third quarter of 1941. The action was expected as shipping space and production are limiting factors at the 100% level now.

On May 8, Jesse Jones stated that the Rubber Reserve Co. was not paying more than 20¢ per pound for emergency stock rubber, despite high prices in the New York market. The major problem continues to be one of obtaining shipping space, rather than one of price. The Rubber Reserve Co. was reported to be purchasing 24,000 long tons of Brazilian rubber for delivery through 1942 at a maximum cost of 20¢ per pound.

Last month labor troubles involving a large number of plantation workers were reported to have broken out in the State of Selangor, Malaya. The strikes were believed to have been provoked by political agitators after the dismissal of workers suspected of being Communistic, rather than by labor grievances. Wages in Malaya are the highest in the history of the rubber industry, and other conditions are generally satisfactory. Authorities are said to have taken immediate steps to insure order.

According to the Commodity Exchange, Inc., an agreement between the London Trade Association and the Ministry of Supply was reached on May 6 whereby the London rubber market would remain open for trading under certain restrictive conditions. Under the new system rubber for shipment to the United Kingdom will be purchased by the Ministry of Supply on f.o.b. terms through market channels, just as the Ministry bought "barter rubber" for the United States. The Ministry becomes the sole importer of rubber, but the rubber trade retains its international business and internal distribution functions.



New York Outside Market—Spot No. 1-X Ribbed Smoked Sheets

An all-time high in United States rubber consumption of 71,374 long tons was recorded in April, against 69,024 tons (revised) in March. Last month usage was reported to be continuing at record levels, and May consumption is expected to be in the neighborhood of 71,000 long tons. The sharp reduction in imports during April to 63,305 long tons was anticipated on the basis of withdrawal of British boats from the Pacific run.

The Commodity Exchange was closed Saturday, May 31, and trading in rubber will be suspended on Saturdays during June, July, August, and September, 1941.

On May 22 discussions were held in Washington between the Office of Price Administration and Civilian Supply and the Commodity Exchange's committee on rubber. An agreement was reached whereby a margin of $1,200 per rubber futures contract will be required on the Exchange. This will apply only to speculative contracts and not to hedging operations by the trade. Previous regulations did not require any original margin, but commission houses have demanded a margin of about $500 per contract. The higher margin requirements are aimed at curbing speculative activity in rubber trading. Definitions and regulations are to be worked out by O. P. A. C. S. and the Commodity Exchange, Inc.

April tire output of 5,812,645 units was the highest since July, 1933; April shipments were 6,049,517 units.

New York Outside Market—Spot Closing Prices—Plantation Grades—Cents per Pound

	—Apr. 1941— 28	29	30	1	2	3	5	6	7	8	9	10	—May, 1941— 12	13	14	15	16	17	19	20	21	22	23	24
No. 1-X R.S.S. in cases*	23 3/8	23 3/4	23 7/8	24 1/8	23 7/8	24 3/8	24 3/8	24 5/8	24 1/4	24 1/4	24 1/2	24 7/8	25	25	25	24 7/8	24 7/8	24 7/8	24 1/2	23 7/8	23 7/8	23 1/8	23 1/2	23
No. 1 Thin Latex Crepe	24 1/8	24 1/2	24 1/2	24 5/8	24 3/8	24 7/8	25	25 3/8	24 3/4	24 3/4	25 1/4	25 5/8	25 3/4	25 3/4	26	25 7/8	25 7/8	25 7/8	25 1/2	24 7/8	25 1/2	24 3/8	24 3/4	24 1/4
No. 2 Thick Latex Crepe	24 1/8	24 1/2	24 1/2	24 5/8	24 3/8	24 7/8	25	25 3/8	24 3/4	24 3/4	25 1/4	25 5/8	25 3/4	25 3/4	26	25 7/8	25 7/8	25 7/8	25 1/2	24 7/8	25 1/2	24 3/8	24 3/4	24 1/4
No. 1 Brown Crepe	23 1/4	23 1/4	23 5/8	23 7/8	23 5/8	24 1/8	24 1/8	24 3/8	24	24	24 1/4	24 5/8	24 3/4	24 3/4	24 3/4	24 5/8	24 5/8	24 5/8	24 1/4	23 5/8	23 5/8	22 7/8	23 1/4	22 3/4
No. 2 Brown Crepe	23 1/8	23	23 3/8	23 5/8	23 3/8	23 7/8	23 7/8	24 1/8	23 3/4	23 3/4	24	24 3/8	24 1/2	24 1/2	24 1/2	24 3/8	24 3/8	24 3/8	24	23 3/8	23 3/8	22 5/8	23	22 1/2
No. 2 Amber	23 1/4	23 1/4	23 5/8	23 7/8	23 5/8	24 1/8	24 1/8	24 3/8	24	24	24 1/4	24 5/8	24 3/4	24 3/4	24 3/4	24 5/8	24 5/8	24 5/8	24 1/4	23 5/8	23 5/8	22 7/8	23 1/4	22 3/4
No. 3 Amber	23 1/8	23	23 3/8	23 5/8	23 3/8	23 7/8	23 7/8	24 1/8	23 3/4	23 3/4	24	24 3/8	24 1/2	24 1/2	24 1/2	24 3/8	24 3/8	24 3/8	24	23 3/8	23 3/8	22 5/8	23	22 1/2
Rolled Brown	22 1/8	22 1/2	22 5/8	22 7/8	22 5/8	23 1/8	23 1/8	23 3/8	23	23 1/4	23 1/2	23 7/8	24	24	24	23 7/8	23 7/8	23 7/8	23 1/2	22 7/8	22 7/8	22 1/8	22 1/2	22

*No. 1 Ribbed Smoked Sheets are 1/8¢ lower than No. 1-X R.S.S. in cases quoted here. †Closed.

New York Outside Market

The actual market continued active last month, with factory demand fairly well maintained, although spotty. Offerings from the Far East were scarce and dependent upon buyers providing the shipping space. The market was firm early in the month, and No. 1-X ribbed smoked sheets in cases, advanced sharply from 23⅞¢ per pound on April 30 to 25¢ on May 12, but then decided to close at 23¢ per pound again on May 24. The closing price on May 27 was 22⅞¢, with the market easy.

With stocks of Brazilian rubber scarce here and in Brazil, local importers and Brazilian shippers on May 10 withdrew quotations on Para rubber, which had advanced wildly to reach a quoted nominal figure of 30 to 34¢. After the withdrawal, some sales of Acre fine Para were reported at as high as 47¢ per pound for August delivery. Latex crepe at 25½¢ per pound on May 21 commanded a 1½¢ premium over No. 1-X ribbed smoked sheets.

New York Outside Market Rubber Quotations

		May 28, 1940	Apr. 25, 1941	May 27, 1941
Latex				
Normal and concentrated (solid content)	lb.	$0.24/0.25	$0.27/0.28	$0.30/0.35
Paras				
Upriver fine	lb.	.19½	.20½	.37
Upriver fine	lb.	*.22	*.32	*.41
Upriver coarse	lb.	.12	.15	.17
Upriver coarse	lb.	*.19½	*.24	*.27
Islands fine	lb.	.19	.20	.30
Islands fine	lb.	*.21½	*.32	*.40
Acre, Bolivian fine	lb.	.19½	.30	.38
Acre, Bolivian fine	lb.	*.22¼	*.32	*.42
Beni, Bolivian fine	lb.	.20½	.31	.38
Madeira fine	lb.	.19¼	.29½	.37
Caucho				
Upper ball	lb.	.12	.15	.17
Upper ball	lb.	*.19½	*.24	*.27
Lower ball	lb.	.11	.14½	.16
Pontianak				
Pressed block	lb.	.13/.18	.12/.25	.14/.26
Guayule				
Ampar	lb.	.15	.15½	.15½
Africans				
Rio Nuñez	lb.	.18½	.19	.19
Black Kassai	lb.	.18½	.19	.19
Prime Niger flake	lb.	.22½	.30	.30
Gutta Percha				
Gutta Siak	lb.	.19¼	.16½	.18½
Gutta Soh	lb.	.30	.25	.29
Red Macassar	lb.	1.20	1.20	1.20
Balata				
Block Ciudad Bolivar	lb.	..	.43	.47
Manaos block	lb.	..	.45	.50
Surinam sheets	lb.	.50	.52	.52
Amber	lb.	.55	.54	.54

* Washed and dried crepe. Shipments from Brazil.

United States Latex Imports

Year	Pounds (d.r.c)	Value
1939	61,460,003	$10,467,552
1940	**75,315,775**	**14,543,975**
1941		
Jan.	4,892,860	**1,019,741**
Feb.	6,598,930	1,279,648
Mar.	3,822,583	774,225

Data from United States Department of Commerce, Washington, D. C.

RECLAIMED RUBBER

ACCORDING to R. M. A. figures, April reclaimed rubber consumption is estimated at 20,427 long tons, 4.2% above the revised March figure of 19,611 long tons; production, 21,574 long tons; and stocks on hand April 30, 35,336 long tons. Reclaim production continues near capacity levels, and the demand during May was reported to be even greater than the high level of April. According to the Department of Commerce, 2,289,203 pounds of reclaim were exported during March, with 1,283,655 pounds going to Canada and 622,837 pounds to the United Kingdom. February exports were 2,260,581 pounds. Prices are unchanged at last month's levels, but the tone of market is firm.

New York Quotations

May 26, 1941

	Sp. Grav.	¢ per lb.
Auto Tire		
Black Select	1.16-1.18	6½/ 6¾
Acid	1.18-1.22	7½/ 7¾
Shoe		
Standard	1.56-1.60	7 / 7¼
Tubes		
Red Tube	1.15-1.30	10½/10¾
Compound	1.10-1.20	9¾/11¾
Miscellaneous		
Mechanical Blends	1.25-1.50	4½/ 5¼
White	1.35-1.50	13½-14½

The above list includes those items or classes only that determine the price bases of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

United States Reclaimed Rubber Statistics—Long Tons

Year	Production†	Consumption†	Consumption % of Crude	U. S. Stocks*†	Exports
1939	186,000	170,000	28.7	25,250	12,611
1940	208,971	190,244	29.3	32,636	11,347
1940					
Jan.	19,239	16,341	28.1	27,089	1,059
Feb.	17,938	15,629	30.0	27,962	1,436
Mar.	17,182	16,200	30.9	27,524	1,420
Apr.	16,518	16,573	31.7	26,492	977
May	17,499	15,984	29.3	27,141	866
June	16,581	15,163	31.7	27,701	858
July	14,299	14,539	30.1	27,129	332
Aug.	17,161	14,464	27.1	28,526	1,300
Sept.	16,379	14,835	28.3	29,039	1,031
Oct.	19,300	16,807	28.2	30,816	716
Nov.	17,636	16,312	28.3	31,459	681
Dec.	19,239	17,397	29.1	32,636	671
1941					
Jan.	20,413	19,086	28.9	33,380	557
Feb.	19,507	18,222	29.1	33,654	1,009
Mar.	22,006	19,611	28.4	35,028	1,002
Apr.	21,574	20,427	28.6	35,336	....

*Stocks on hand the last of the month or year. †Corrected to 100% from estimates of reported coverage. *Compiled by The Rubber Manufacturers Association, Inc.*

Tire Production Statistics

Pneumatic Casings

	Inventory	Production	Shipments
1939	8,664,505	57,612,731	57,508,775
1940	9,126,528	59,186,423	58,774,437
1940			
Jan.	9,351,887	4,955,343	4,273,638
Feb.	10,137,232	4,915,522	4,143,997
Mar.	10,789,446	5,025,394	4,373,461
Apr.	10,866,927	5,091,945	5,037,153
May	10,522,523	5,413,002	5,755,448
June	8,871,438	5,131,141	6,802,534
July	9,350,026	4,788,127	4,317,940
Aug.	9,910,691	4,676,469	4,123,384
Sept.	9,837,395	4,412,574	4,462,486
Oct.	9,409,683	5,076,951	5,525,075
Nov.	9,162,995	4,731,995	4,968,533
Dec.	9,126,528	4,967,960	4,990,788
1941			
Jan.	9,797,253	5,486,296	4,849,748
Feb.	10,028,803	5,161,267	4,896,340
Mar.	10,148,861	5,685,559	5,517,255
Apr.	9,957,849	5,812,645	6,049,517

Pneumatic Casings

	Original Equipment	Replacement Sales	Export Sales
1939	18,207,556	38,022,034	1,279,185
1940	22,252,869	35,345,656	1,175,912
1940			
Jan.	1,809,745	2,375,132	88,761
Feb.	1,972,155	2,085,376	86,466
Mar.	2,047,904	2,247,706	77,851
Apr.	2,094,532	2,850,974	91,647
May	1,998,303	3,671,114	86,304
June	1,925,147	4,794,649	82,738
July	857,605	3,378,730	81,605
Aug.	704,557	3,335,114	83,713
Sept.	1,464,774	2,898,119	99,593
Oct.	2,319,762	3,062,984	142,329
Nov.	2,434,895	2,409,340	124,298
Dec.	2,623,763	2,236,418	130,607
1941			
Jan.	2,291,209	2,424,730	133,809
Feb.	2,546,120	2,203,297	146,923
Mar.	2,638,066	2,728,557	150,632
Apr.	2,333,827	3,582,579	133,111

Inner Tubes

	Inventory	Production	Shipments
1939	7,035,671	50,648,556	51,190,314
1940	7,016,948	52,237,003	52,214,079
1940			
Jan.	7,416,746	4,199,452	3,760,645
Feb.	7,828,100	4,206,831	3,805,412
Mar.	8,110,052	4,394,934	4,116,847
Apr.	8,191,477	4,615,287	4,547,309
May	8,205,642	4,737,063	4,744,540
June	6,848,825	4,350,900	5,686,171
July	7,096,075	4,019,834	3,792,863
Aug.	7,793,574	4,305,681	3,599,755
Sept.	7,970,110	4,099,272	3,951,538
Oct.	7,647,912	4,547,980	4,875,583
Nov.	7,056,456	4,103,856	4,689,635
Dec.	7,016,948	4,655,913	4,643,781
1941			
Jan.	7,632,655	5,112,824	4,473,942
Feb.	7,924,383	4,887,190	4,610,313
Mar.	8,068,646	5,349,202	5,181,198
Apr.	8,142,692	5,495,762	5,371,451

Inner Tubes

	Original Equipment	Replacement Sales	Export Sales
1939	18,190,630	31,997,906	1,001,778
1940	22,172,452	29,069,547	972,080
1940			
Jan.	1,815,224	1,877,636	67,785
Feb.	1,971,422	1,769,895	64,095
Mar.	2,046,222	2,018,583	52,042
Apr.	2,094,016	2,385,527	67,716
May	1,981,720	2,691,008	71,812
June	1,908,870	3,739,604	67,697
July	855,150	2,872,294	65,419
Aug.	703,548	2,827,863	68,344
Sept.	1,435,306	2,422,995	92,237
Oct.	2,302,383	2,444,689	128,511
Nov.	2,430,708	2,146,079	112,848
Dec.	2,626,883	1,903,324	113,574
1941			
Jan.	2,281,274	2,082,311	110,357
Feb.	2,545,877	1,932,703	131,733
Mar.	2,647,533	2,405,927	127,738
Apr.	2,336,715	2,919,614	115,122

Source: The Rubber Manufacturers Association, Inc. Figures adjusted to represent 100% of the industry.

COMPOUNDING INGREDIENTS

WITH rubber manufacturing activity maintaining record levels again last month, the demand for compounding ingredients continued heavy. Current consumption levels are expected to continue for some time. There remains, however, the possibility of government restrictions on rubber for civilian use in order to offset increasing quantities of rubber going into defense production.

The Bureau of Mines reported that sales of talc, prophyllite, and ground soapstone in 1940 totaled 281,375 short tons, value $3,008,320, an increase of 11% in quantity and value over 1939. The rubber industry, fifth among the users of these materials, last year used 28,501 short tons, or 10% of the total, against 31,078 short tons, or 12% of the total, in 1939, when it was third highest on the list of consumers.

CARBON BLACK. The demand was heavy with no signs of diminishing. Production operations were reported to be such that requirements under all conditions can be met satisfactorily. Prices are firm and unchanged. During April producers stocks rose 13,000,000 pounds to 155,000,000 pounds, and shipments totaled 28,000,000 pounds.

CLAYS. The demand for rubber clays continues heavy. Prices are steady.

FACTICE OR RUBBER SUBSTITUTE. The demand continues active. Neophax types advanced in price; while others held generally steady.

LITHARGE. The movement into consumption continued heavy. Prices are steady.

LITHOPONE. Shipments were at a high level, and the price steady and unrevised.

RUBBER CHEMICALS. The demand for accelerators and antioxidants continues heavy. Prices are generally steady.

RUBBER SOLVENTS. Deliveries to tire manufacturers were at high levels. Prices are firm and unaltered.

TITANIUM PIGMENTS. The demand by the rubber industry has been very active and general throughout the entire industry. There was reported to be some discussion in Washington which indicated that tire manufacturers may be required to discontinue the manufacture of white sidewall tires in which titanium pigments are used. Also, P. W. Litchfield said last month that a white sidewall tire requires an additional two pounds of rubber as compared with a standard black tire, and the public may have to do without white sidewalls to conserve rubber.

ZINC OXIDES. The demand continued heavy. Prices are firm and unchanged. The government's zinc metal pool for defense needs was raised from 5% of production in April to 17% for May and to 22% for June.

Current Quotations*

Abrasives

Pumicestone, powdered	lb.	$0.0325/$0.0425
Rottenstone, domestic	lb.	.025 / .03

Accelerators, Inorganic

Lime, hydrated, *l.c.l.*, New York	ton	20.00
Litharge (commercial)	lb.	.08

Accelerators, Organic

A-1	lb.	$0.24 /$0.30
A-10	lb.	.31 / .35
A-19	lb.	.52 / .65
A-32	lb.	.70 / .80
A-77	lb.	.42 / .55
A-100	lb.	.42 / .55
Accelerator 49	lb.	.41 / .42
531	lb.	.48 / .50
737	lb.	.42 / .43
737-50	lb.	.25 / .26
808	lb.	.70 / .72
833	lb.	1.15
Acrin	lb.	.60
Aldehyde ammonia	lb.	.65 / .70
Altax	lb.	.55 / .60
B-J-F	lb.	.50 / .55
Beutene	lb.	.70 / .75
Butyl Eight	lb.	.98 / 1.00
Zimate	lb.	2.15
C-P-B	lb.	2.00
Captax	lb.	.50
Crylene	lb.	
Paste	lb.	
D-B-A	lb.	2.00
Delac A	lb.	.40 / .50
O	lb.	.40 / .50
P	lb.	.40 / .50
Di-Esterex-N	lb.	.60 / .70
DOTG (Di-ortho-tolyguanidine)	lb.	.44 / .46
DPG (Diphenylguanidine)	lb.	.35 / .45
El-Sixty	lb.	.50 / .65
Ethylidene aniline	lb.	.42 / .43
Ethyl Zimate	lb.	2.15
Formaldehyde P.A.C.	lb.	.06
Formaldehyde-para-toluidine	lb.	.52 / .54
Formaniline	lb.	.31 / .32
Guantal	lb.	.40 / .50
Hepteen	lb.	.35 / .40
Base	lb.	1.35 / 1.50
Hexamethylenetetramine U.S.P.	lb.	.39
Technical	lb.	.33
Lead oleate, No. 999	lb.	.14
Witco	lb.	.15
Ledate	lb.	2.00
Monex	lb.	2.00
Novex	lb.	
O-X-A-F	lb.	.50 / .55
Oxynone	lb.	.77 / .90
Para-nitroso-dimethylaniline	lb.	.85
Pentex	lb.	1.00 / 1.10
Flour	lb.	.15 / .16
O	lb.	
Flour	lb.	
Phenex	lb.	.50 / .55
Pip-Pip	lb.	2.15
Pipsolene	lb.	1.55 / 1.80
R-23	lb.	.40
R & H 50-D	lb.	.42 / .43
Rotax	lb.	.60 / .65
Safex	lb.	1.20 / 1.30
Santocure	lb.	.80 / 1.00
Selenac	lb.	2.50
SPDX	lb.	.70 / .75
A	lb.	.70 / .75
Super-sulphur No. 1	lb.	.50
2	lb.	.18 / .20
Tetrone A	lb.	2.35
Thiocarbanilide	lb.	.24 / .30
Thionex	lb.	2.00
Thiurad	lb.	2.00
Trimene	lb.	.55 / .65
Base	lb.	1.05 / 1.20
Triphenylguanidine (TPG)	lb.	.45
Tuads	lb.	2.00
2-MT	lb.	.54
Ulto	lb.	1.25 / 1.50
Ureka	lb.	.60 / .75
Blend B	lb.	.60 / .75
C	lb.	.56 / .65
Vulcanex	lb.	.42 / .43
Vulcanol	lb.	.85
Z-B-X	lb.	2.50
Zenite	lb.	.46 / .48
A	lb.	.53 / .55
B	lb.	.46 / .48
Zimate (Methyl)	lb.	2.00

Activators

Aero Ac 50	lb.	.46 / .52
Barak	lb.	.50
MODX	lb.	.30 / .35
SL No. 20	lb.	.085 / .10

Age Resisters

AgeRite Alba	lb.	2.00
Exel	lb.	1.00 / 1.02
Gel	lb.	.57 / .59
Hipar	lb.	.65 / .67
Powder	lb.	.52 / .54
Resin	lb.	.52 / .54
D	lb.	.52 / .54
White	lb.	1.25 / 1.40
Akroflex C	lb.	.56 / .58
Albasan	lb.	$0.70 /$0.75
Aminox	lb.	.52 / .61
Antox	lb.	.56
Betanox	lb.	.52 / .61
Special	lb.	.65 / .74
B-L-E	lb.	.52 / .61
Powder	lb.	.65 / .74
B-X-A	lb.	.52 / .61
Copper Inhibitor X-872-A	lb.	1.15
Flectol B	lb.	.52 / .65
H	lb.	.52 / .65
White	lb.	.90 / 1.15
M-U-F	lb.	1.50
Neozone (standard)	lb.	.63
A	lb.	.52 / .54
B	lb.	.63
C	lb.	.52 / .54
D	lb.	.52 / .54
E	lb.	.63
Oxynone	lb.	.68
Parazone	lb.	.77 / .90
Permalux	lb.	1.20
Santoflex B	lb.	.52 / .65
BX	lb.	.58 / .71
Santovar A	lb.	1.15 / 1.40
Solux	lb.	1.30
Stabilite	lb.	.52 / .54
Alba	lb.	.70 / .75
Thermoflex	lb.	1.20 / 1.15
A	lb.	.65 / .67
Tysonite	lb.	.16 / .165
V-G-B	lb.	.52 / .61

Alkalies

Caustic soda, flake, Columbia (400-*lb. drums*)	100 lbs.	2.70 / 3.55
liquid, 50%	100 lbs.	1.95
solid (700-*lb. drums*)	100 lbs.	2.30 / 3.15

Antiscorch Materials

A-F-B	lb.	.35 / .40
Antiscorch T	lb.	.90
Cumar RH	lb.	.10
E-S-E-N	lb.	.35 / .40
R-17 Resin (*drums*)	lb.	.10
RM	lb.	1.25
Retarder W	lb.	.36
Retardex	lb.	.45 / .48
U-T-B	lb.	.35 / .40

Antiseptics

Compound G-4	lb.	
G-11	lb.	

Antisun Materials

Heliozone	lb.	.22 / .23
S.C.R.	lb.	.33 / .35
Sunproof	lb.	.235 / .275

Blowing Agents

Ammonium Carbonate, lumps (500-*lb. drums*)	lb.	.0825
Unicel	lb.	.50

Brake Lining Saturant

B.R.T No. 3	lb.	.0165/ .0175

Colors

Black

Du Pont powder	lb.	.42 / .44
Lampblack (commercial), *l.c.l.*	lb.	.15

Blue

Du Pont Dispersed	lb.	.83 / 3.95
Powders	lb.	2.25 / 3.75
Heliogen BKA	lb.	
Toners	lb.	

Brown

Mapico	lb.	.11

Green

Chrome	lb.	.23
oxide (*freight allowed*)	lb.	
Du Pont Dispersed	lb.	.98 / 2.85
Powders	lb.	1.00 / 5.50
Guignet's (*bbls.*)	lb.	.70
Toners	lb.	

Orange

Du Pont Dispersed	lb.	.88 / 2.00
Powders	lb.	.88 / 2.75
Toners	lb.	

Orchid

Toners	lb.	

Pink

Toners	lb.	

Purple

Toners	lb.	

Red

Antimony Crimson, 15/17%	lb.	.30
R. M. P. No. 3	lb.	.48
Sulphur free	lb.	.52
R.M.P.	lb.	.52
Golden 15/17%	lb.	.28
7-A	lb.	.37
Z-2	lb.	.23

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing of known ingredients. Requests for information not recorded will receive prompt attention.

Cadmium, light (400-*lb. bbls.*)	*lb.*	$0.75	/$0.80
Du Pont Dispersed	*lb.*	.93	/ 2.05
Powders	*lb.*	.285	/ 1.65
Iron Oxide, *l.c.l.*	*lb.*	.06	/ .11
Mapico	*lb.*	.0925	
Rub-Er-Red (*bbls.*)	*lb.*	.0925	
Toners	*lb.*		

White

Lithopone (*bags*)	*lb.*	.0385/	.0410
Albalith	*lb.*	.0385/	.0410
Astrolith (50-*lb. bags*)	*lb.*	.0385/	.0410
Azolith	*lb.*	.0385/	.0410
Titanium Pigments			
Ray-bar	*lb.*	.055 /	.065
Ray-cal	*lb.*	.0525/	.0625
Rayox	*lb.*	.135 /	.165
Titanolith (50-*lb. bags*)	*lb.*	.0525/	.055
Titanox-A	*lb.*	.135 /	.165
B	*lb.*	.055 /	.065
30	*lb.*	.055 /	.065
C	*lb.*	.0525/	.0625
M	*lb.*	.055 /	.065
Ti-Tone	*lb.*		
Zopaque (50-*lb. bags*)	*lb.*	.135 /	.14
Zinc Oxide			
Azo ZZZ-11	*lb.*	.065 /	.0675
44	*lb.*	.065 /	.0675
55	*lb.*	.065 /	.0675
66	*lb.*	.08 /	.0825
French Process, Florence			
Green Seal-8	*lb.*	.0825/	.0850
Red Seal-9	*lb.*	.0775/	.08
White Seal-7	*lb.*	.0875/	.09
Kadox, Black Label-15	*lb.*	.065 /	.0675
No. 25	*lb.*	.0775/	.08
Red Label-17	*lb.*	.065 /	.0675
Horse Head Special 3	*lb.*	.065 /	.0675
XX Red-4	*lb.*	.065 /	.0675
23	*lb.*	.065 /	.0675
72	*lb.*	.065 /	.0675
78	*lb.*	.065 /	.0675
80	*lb.*	.065 /	.0675
103	*lb.*	.065 /	.0675
110	*lb.*	.065 /	.0675
St. Joe (lead free)			
Black Label	*lb.*	.065 /	.0675
Green Label	*lb.*	.065 /	.0675
Red Label	*lb.*	.065 /	.0675
U.S.P.	*lb.*	.0975/	.10
Zinc Sulphide Pigments			
Cryptone-BA-19	*lb.*	.0525/	.055
BT	*lb.*	.0525/	.055
CB	*lb.*	.0525/	.055
MS	*lb.*	.055 /	.0575
ZS No. 20	*lb.*	.0775/	.08
86	*lb.*	.0775/	.08
230	*lb.*	.0775/	.08
800	*lb.*	.0775/	.08
Sunolith	*lb.*	.0385/	.0410

Yellow

Cadmolith (cadmium yellow), (400-*lb. bbls.*)	*lb.*	.50 /	.55
Du Pont Dispersed	*lb.*	1.25 /	1.75
Powders	*lb.*	.135 /	1.37
Mapico	*lb.*	.0675	
Toners	*lb.*		

Dispersing Agents

Bardex	*lb.*	.0395/	.042
Bardol	*lb.*	.0225/	.025
Darvan No. 1	*lb.*	.30 /	.34
No. 2	*lb.*	.30 /	.34
Nevoll (*drums, c.l.*)	*lb.*	.0225	
Santomerse S	*lb.*	.11 /	.25

Fillers, Inert

Asbestine, *c.l.*	*ton*	15.00	
Barytes	*ton*	30.00	/36.00
f.o.b., St. Louis (50-*lb. paper bags*)	*ton*	22.85	
off color, domestic	*ton*	21.50	/26.50
white, imported	*ton*	30.00	/36.00
Blanc fixe, dry, precip.	*lb.*	.03 /	.035
Calcene	*ton*	37.50	/43.00
Infusorial earth	*lb.*	.025 /	.03
Kalite No. 1	*ton*	24.00	/30.00
3	*ton*	34.00	/40.00
Kalvan	*ton*	95.00	
Magnesia, calcined, heavy	*lb.*		
Magnesium Carbonate, *l.c.l.*	*lb.*	.0725/	.095
Paradene No. 2 (*drums*)	*lb.*	.045	
Pyrax A	*ton*	6.50	
Whiting			
Columbia Filler	*ton*	9.00	/14.00
Suprex, white extra light	*ton*	30.00	
heavy	*ton*	30.00	
Witco, *c.l.*	*ton*	6.00	

Finishes

Black-Out (surface protective)	*gal.*	4.00	/ 5.00
Mica, *l.c.l.*	*ton*	42.00	/52.00
Rubber lacquer, clear	*gal.*	1.00	/ 2.00
colored	*gal.*	2.00	/ 3.50
Shoe Varnish	*gal.*	1.45	
Talc	*ton*	.025 /	.035

Flock

Cotton flock, dark	*lb.*	.09 /	.12
dyed	*lb.*	.45 /	.80
white	*lb.*	.11 /	.19
Rayon flock, colored	*lb.*	1.15 /	1.50
white	*lb.*	1.00 /	1.00

Latex Compounding Ingredients

A-342	*lb.*	$1.00	/$1.25
Accelerator 85	*lb.*	.35	
89	*lb.*	1.40	
122	*lb.*	1.55	
552	*lb.*	2.15	
Aerosol OT Aqueous 10%	*lb.*	.125	
Antox, dispersed	*lb.*	.42	
Aquarex D	*lb.*	.75	
F	*lb.*	.85	
Special WA Paste	*lb.*	.28	
Areskap No. 50	*lb.*	.18 /	.24
100, dry	*lb.*	.39 /	.51
Aresket No. 240	*lb.*	.16 /	.22
300, dry	*lb.*	.42 /	.50
Areskdene No. 375	*lb.*	.35 /	.50
400, dry	*lb.*	.51 /	.65
Black No. 25, dispersed	*lb.*	.22 /	.40
Casein	*lb.*	.21	
Collocarb	*lb.*	.07	
Color Pastes, dispersed	*lb.*	.38 /	1.90
Copper Inhibitor X-872	*lb.*	2.25	
Dispersex No. 15	*lb.*	.11 /	.12
No. 20	*lb.*	.08 /	.10
Factex Dispersion A	*lb.*	.16	
Heliozone, dispersed	*lb.*	.25	
Igepon A	*lb.*	.09	
Latac	*lb.*	2.50	
MICRONEX, Colloidal	*lb.*	.055 /	.065
Nekal BX (dry)	*lb.*		
Pipsol X	*lb.*	3.05 /	3.55
R-2 Crystals	*lb.*	2.50 /	2.75
RN-2 Crystals	*lb.*	2.00 /	2.25
S-1 (400 *lb. drums*)	*lb.*	.65	
Santobrite Briquettes	*lb.*		
Powder	*lb.*		
Santomerse D	*lb.*	.41 /	.65
S	*lb.*	.11 /	.25
Stablex A	*lb.*	.90 /	1.10
B	*lb.*	.65 /	.90
C	*lb.*	.40 /	.50
Sulphur, dispersed	*lb.*	.10 /	.15
No. 2	*lb.*	.075 /	.12
T-1 (440-*lb. drums*)	*lb.*	.40	
Tepidone	*lb.*	1.03	
Vulcan Colors	*lb.*		
Zenite Special	*lb.*	.55	
Zinc oxide, dispersed	*lb.*	.12 /	.15

Mineral Rubber

Black Diamond	*ton*	25.00	
B.R.C. No. 20	*lb.*	.009 /	.01
Hydrocarbon, hard	*ton*	23.00	/27.00
Genasco Hydrocarbon, granulated	*ton*		
solid	*ton*		
Gilsonite	*ton*		
Parmr	*ton*	23.00	/27.00
Pioneer	*ton*		
285°-300°	*ton*	22.00	

Mold Lubricants

Aluminum Stearate	*lb.*	.18 /	.19
Aquarex D	*lb.*	.75	
WA Paste	*lb.*	.25	
Special	*lb.*	.28	
Lubrex	*lb.*	.25 /	.30
Mold Paste	*lb.*	.12 /	.18
Rubber-Glo, conc. regular	*gal.*	.94 /	1.15
Type W	*gal.*	.99 /	1.20
Sericite	*ton*	65.00	/75.00
Soapbark	*lb.*		
Soapstone, *l.c.l.*	*ton*	25.00	/35.00

Oil Resistant

A-X-F	*lb.*	.82 /	.85

Reclaiming Oils

B.R.V.	*lb.*	.032 /	.0345
No. 1621	*lb.*	.019 /	.02
S.R.O.	*lb.*	.019 /	.02
X-159	*gal.*	.20 /	.32
Rox No. 1	*lb.*	.0225/	.025

Reenforcers

Carbon Black			
Aerfloted Arrow Specification (*bags only*)	*lb.*	.03175†	
Arrow Compact Granulized	*lb.*	.03175†	
Certified Heavy Compressed (*bags only*)	*lb.*	.03175†	
Spheron	*lb.*	.03175†	
Continental, dustless	*lb.*	.03175†	
Compressed (*bags only*)	*lb.*	.03175†	
Disperso	*lb.*	.03175†	
Dixie	*lb.*	.03175†	
Dixiedensed	*lb.*	.03175†	
66	*lb.*	.03175†	
Excello, dustless	*lb.*	.03175†	
Furnex	*lb.*		
Beads	*lb.*		
Gastex	*lb.*	.03 /	.07
Kosmobile	*lb.*	.03175†	
66	*lb.*	.03175†	
Kosmos	*lb.*	.03175†	
MICRONEX Beads	*lb.*	.03175†	
Mark II	*lb.*	.03175	
Standard	*lb.*	.03175	
W-5	*lb.*	.03175	
W-6	*lb.*	.03175	

†Price quoted is f.o.b. works (bags). The price f.o.b. works (bulk) is $0.03 per pound; f.o.b. Hoboken (bulk) $0.0397; f.o.b. No. Atlantic Docks (bags), $0.0415. All prices are carlot.

P-33	*lb.*	$0.0475	
Pelletex	*lb.*	.03	/$0.07
Supreme, dustless	*lb.*	.03175†	
Thermax	*lb.*	.02	
Velvetex	*lb.*	.04 /	.06
"WYEX BLACK"	*lb.*	.03175†	
Carbonex Flakes	*lb.*	.029 /	.034
S	*lb.*	.03 /	.0350
Clays			
Aerfloted Paragon (50-*lb. bags*)	*ton*	10.00	
Suprex (50-*lb. bags*)	*ton*	10.00	
Barden	*ton*	10.00	
Catalpo, *c.l.*	*ton*	30.00	
Clay "L"	*ton*	8.00	
Chicora	*ton*	10.00	
China	*ton*	22.50	
Crown	*ton*	10.00	
Dixie	*ton*	10.00	
Hi-White	*ton*	10.00	
Langford	*ton*	7.50	
McNamee	*ton*	10.00	
Par	*ton*	10.00	
Paraforce, *c.l.*	*ton*	60.00	
Witco, *c.l.*	*ton*	10.00	
Cumar EX	*lb.*	.045	
MH	*lb.*	.06 /	.11
V	*lb.*	.09 /	.12
Silene	*lb.*	.04 /	.045

Reodorants

Amora A	*lb.*		
B	*lb.*		
C	*lb.*		
D	*lb.*		
Curodex 19	*lb.*		
188	*lb.*		
198	*lb.*		
Para-Dors	*lb.*		
Rodo No. 0	*lb.*	3.50 /	4.00
10	*lb.*	4.50 /	5.00

Rubber Substitutes

Black	*lb.*	.08 /	.12
Brown	*lb.*	.08 /	.115
White	*lb.*	.08 /	.135
Factice			
Amberex Type B	*lb.*	.1875	
Brown	*lb.*	.09 /	.115
Fac-Cel B	*lb.*	.1325	
C	*lb.*	.1325	
Neophax A	*lb.*	.119	
B	*lb.*	.12	
White	*lb.*	.09 /	.135

Softeners

B.R.T. No. 7	*lb.*	.0165/	.0175
Bondogen	*lb.*	.98 /	1.05
Burgundy pitch	*lb.*		
Copene Resin	*lb.*	.20	
Cycline oil	*gal.*	.14 /	.20
Dispersing Oil No. 10	*lb.*	.0335/	.036
Nevinol	*lb.*	.13 /	.14
Nuba resinous pitch (*drums*)			
Grades No. 1 and No. 2	*lb.*	.0265	
3-X	*lb.*	.04	
Nypene Resin	*lb.*	.0165	
Palm oil (Witco), *c.l.*	*lb.*		
Palmol	*lb.*	.13	
Para Flux	*gal.*	.09 /	.18
No. 2016	*gal.*	.125 /	.20
Para Lube	*lb.*	.0425/	.048
Pine tar	*gal.*		
Oil	*gal.*	.30	
Plastogen	*lb.*	.0775/	.08
Plastone	*lb.*	.27 /	.30
R-19 Resin (*drums*)	*lb.*	.10	
21 Resin (*drums*)	*lb.*	.10	
Reogen	*lb.*	.12 /	.18
RPA No. 1	*lb.*	.65	
2	*lb.*	.65	
3	*lb.*	.46	
4	*lb.*	.80	
Tackol	*lb.*	.085 /	.18
Tonox	*lb.*	.52 /	.61
Tonox D	*lb.*	.75 /	.85
Witco No. 20, *l.c.l.*	*gal.*	.20	
X-1 resinous oil (*tank car*)	*lb.*	.019	

Softeners for Hard Rubber Compounding

Resin C. Pitch 45°C. M.P.	*lb.*	.013 /	.014
60°C. M.P.	*lb.*	.013 /	.014
75°C. M.P.	*lb.*	.013 /	.014

Solvents

Beta-Trichlorethane	*lb.*	.20	
Carbon Bisulphide	*lb.*	.05	
Tetrachloride	*gal.*	.665	
Cosol No. 1	*gal.*	.25 /	.30
No. 2	*gal.*	.24 /	.32
No 3	*gal.*	.24 /	.32
Industrial 90% benzol (*tank car*)	*gal.*	.14 /	.21
Skellysolve	*gal.*		

Stabilizers for Cure

Calcium Stearate	*lb.*	.20 /	.22
Laurex (*bags*)	*lb.*	.1175/	.1425
Lead Stearate	*lb.*	.25	
Stearex B	*lb.*	.1225/	.1325
Beads	*lb.*	.12 /	.13
Stearic acid, single pressed	*lb.*	.1225/	.1325
Stearite, *c.l.*	*lb.*	.12	
Zinc stearate	*lb.*	.23 /	.28

(*Continued on page 86*)

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

Futures	Mar. 29	Apr. 26	May 3	May 10	May 17	May 24
May	11.31	11.14	11.81	12.39	.....	.....
June	.....	.....	11.82	12.40	12.94	13.22
July	11.24	11.15	11.83	12.42	12.92	13.20
Sept.	11.18	.....	11.86	12.51	13.01	13.28
Dec.	11.15	11.10	11.89	12.64	13.13	13.40
Mar.	11.10	11.17	11.86	12.64	13.20	13.42
Apr.	.....	.....	.....	.....	13.22	13.42

New York Quotations

May 23, 1941

Drills

38-inch 2.00-yard	yd.	$0.16⅜
40-inch 3.47-yard		.10
50-inch 1.52-yard		.23½
52-inch 1.85-yard		.19⅝
52-inch 1.90-yard		.19⅛/.19½
52-inch 2.20-yard		.18⅜
52-inch 2.50-yard		.16¼
59-inch 1.85-yard		.20

Ducks

38-inch 2.00-yard D. F.	yd.	.16½/.17
40-inch 1.45-yard S. F.		.22¾
51½-inch 1.35-yard D. F.		.24½
72-inch 1.05-yard D. F.		.34¼/.34¾
72-inch 17.21 ounce		.39½
Mechanicals		
Hose and belting	lb	.33
Tennis		
51½-inch 1.35-yard	yd.	.26⅝
51½-inch 1.60-yard	yd.	.22⅞
51½-inch 1.90 yard	yd.	.19

Hollands

Blue Seal		
20-inch	yd.	.10½
30-inch		.19½
40-inch		.21½
Gold Seal		
20-inch No. 72	yd.	.11½
30-inch No. 72		.20½
40-inch No. 72		.23
50-inch No. 72		.31
Red Seal		
20-inch	yd.	.10
30-inch		.18¼
40-inch		.20
50-inch		.29

Osnaburgs

40-inch 2.34-yard	yd.	.14⅝
40-inch 2.48-yard		.13½
40-inch 2.56-yard		.12⅝
40-inch 3.00-yard		.11½
40-inch 7-ounce part waste		.12¾
40-inch 10-ounce part waste		.18
37-inch 2.42-yard		.13⅝

Raincoat Fabrics

Cotton		
Bombazine 60 x 64	yd.	.11⅝
Plaids 60 x 48		.13⅜
Surface prints 60 x 64		.14½
Print cloth, 38½-inch, 60 x 64		.08⅝
Sheetings, 40-Inch		
48 x 48, 2.50-yard	yd.	.13¼/.14
64 x 68, 3.15-yard		.11½
56 x 60, 3.60-yard		.10⅜/.10½
44 x 40, 4.25-yard		.08⅝/.09
Sheetings, 36-Inch		
48 x 48, 5.00-yard	yd.	.07½
44 x 40, 6.15-yard		.06

Tire Fabrics

Builder		
17¼ ounce 60" 23/11 ply Karded peeler	lb.	.34
Chafer		
14 ounce 60" 20/8 ply Karded peeler	lb.	.33½
9¼ ounce 60" 10/2 ply Karded peeler	lb.	.33
Cord Fabrics		
23/5/3 Karded peeler, 1 7/32" cotton	lb.	.34½
15/3/3 Karded peeler, 1 7/32" cotton	lb.	.32½
12/4/2 Karded peeler, 1 7/32" cotton	lb.	.31½
23/5/3 Karded peeler, 1¼" cotton	lb.	.40
23/5/3 Combed Egyptian	lb.	.53½
Lone Breaker		
8¾ ounce and 10¼ ounce 60" Karded peeler	lb.	.36

THE cotton market advanced sharply last month upon passage of the 85% parity loan bill. The New York 15/16-inch spot middling price, after closing at 11.71¢ per pound on April 30, scored sharp gains during May to close at 13.63¢ per pound on May 26. Thereafter the market was steady, with the price closing at 13.58¢ on May 27.

With overwhelming majorities, the House and Senate passed the Fulmer bill last month, which provides mandatory loans of 85% of parity to growers of cotton, corn, wheat, rice, and tobacco. Parity for cotton is figured at 16¢ per pound; thus the 85% loan would amount to 13.6¢. This, together with parity payments of 1.38¢ and soil conservation payments of 1.37¢, would mean that cotton growers would receive a total of 16.35¢ per pound. However, when the President signed the bill on May 26 he emphasized that his approval of the measure was based on an understanding with Congressional leaders that parity payments will be limited to the amount necessary to bring total payments to parity levels, but not beyond.

Counteracting the bullish effects of the Fulmer bill was the establishment by the Office of Price Administration of a ceiling on combed yarn prices.

The New York Cotton Exchange is to take up with the Government the question of speculation curtailment. The price of cotton has advanced sharply from 9½¢ in February to over 13¢, chiefly influenced by government legislation. Moreover the exchange has rules restricting speculation—an advance of $250 in margin per contract for every 6¢ price rise. The margin was automatically advanced to $750 when the price rose above 12¢ recently.

Consumption of cotton in domestic mills during April again set a new all-time monthly record of 920,142 bales, according to the Census Bureau. This figure compares with the previous high record of 854,179 bales in March and with 623,098 bales in April, 1940. For nine months consumption was 6,995,238 bales, against 5,953,999 the previous season. Exports were 74,009 bales in April, against 97,292 in March and 344,609 in April, 1940.

Fabrics

The demand for fabrics was extremely active during the first part of last month and then became more moderate. The major development was the action taken by the Office of Price Administration in establishing a ceiling on combed yarn prices. This was followed by an attack by Senator Smith against price fixing of yarns, and it was felt generally that Congressional opposition would develop to prevent an extension of control to other cotton products. Mills in nearly every instance are sold through the third quarter and, in many cases, through the fourth quarter.

The market advanced sharply in May, with prices firm at the end of the month, indicating the possibility of further advances. Prices quoted here have all advanced with the exception of hollands which hold steady.

RUBBER SCRAP

THE demand for scrap rubber continued at a high level during May, and collections were reported fair. Exports during March, according to the Department of Commerce, were 5,982,972 pounds, against 9,068,163 pounds in February. Japan took 3,662,935 pounds in March.

The market continues strong, with price advances on boots and shoes, inner tubes, and all tire grades except tire carcass, black auto peelings, and light gravity solid types. Mechanicals and hard rubber scrap held steady.

Consumers' Buying Prices

(Carlot Lots for May 26, 1941)

Boots and Shoes		Prices
Boots and shoes, black	lb.	$0.01⅜/$0.01½
Colored	lb.	.01⅜/.01¼
Untrimmed arctics	lb.	.01⅜/.01¼

Inner Tubes		
No. 1, floating	lb.	.12 / .14
No. 2, compound	lb.	.06¾/.06⅞
Red	lb	.06 / .06⅛
Mixed tubes	lb.	.05¼/.05⅜

Tires (Akron District)		
Pneumatic Standard		
Mixed auto tires with beads	ton	16.50 /17.00
Beadless	ton	22.50
Auto tire carcass	ton	47.00 /52.00
Black auto peelings	ton	48.00 /50.00
Solid		
Clean mixed truck	ton	36.00 /37.00
Light gravity	ton	45.00 /48.00

Mechanicals		
Mixed black scrap	ton	33.00 /34.00
Hose, air brake	ton	22.00 /24.00
Garden, rubber covered	ton	12.00 /14.00
Steam and water, soft	ton	12.00 /14.00
No. 1 red	lb.	.03½/.04
No. 2 red	lb.	.02½/.02¾
White druggists' sundries	lb.	.04 / .04⅛
Mixed mechanicals	lb.	.02¾/.03
White mechanicals	lb.	.04 / .04⅛

Hard Rubber		
No. 1 hard rubber	lb.	.12 / .14

Current Quotations

(Continued from page 84)

Synthetic Rubber		
Neoprene Type E	lb.	.65
G	lb.	.70
GN	lb.	.65
I	lb.	.70
KN	lb.	.75
M	lb.	.65
Latex Type 56	lb.	.30
57	lb.	.30
Synthetic 100	lb.	.41

Tackifier		
B.R.H. No. 2	lb.	.017 / .02

Vulcanizing Ingredients		
Magnesia, light (for neoprene)	lb.	.25
Sulphur	100 lbs.	2.00
Chloride (*drums*)	lb.	.04
Telloy	lb.	1.75
Vandex	lb.	1.75
(See also Colors—Antimony)		

Waxes		
Carnauba, No. 3 chalky	lb.	.63
2 N.C.	lb.	.68
3 N.C.	lb.	.635
1 Yellow	lb.	.72 / .73
2	lb.	.71 / .72

Substantial as an Oak . . . . .

That word "Substantial" assumes more importance than ever in times like these. The soundness and reliability of our organization and its products has never meant more to users of industrial fabrics than it does today. The roots of our experience are lodged deep in the 96 years of active service we have seen — the branches of our activities encompass the varied production of the 19 modern mills we represent.

FOR INSTANCE:

Fabrics for the Rubber Industry

Our hose and belting ducks, chafer fabrics, balloon cloths and sheetings have won widespread acceptance among rubber engineers. Year after year, they have demonstrated their consistent uniformity and their scientific construction to meet the rubber industry's requirements.

ESTABLISHED 1845

WELLINGTON SEARS COMPANY

65 WORTH STREET, NEW YORK, N. Y.

IMPORTS, CONSUMPTION, AND STOCKS

THE R. M. A. has estimated that United States rubber manufacturers consumed 71,374 long tons of crude rubber during April, a record high, and 3.4% above March and 36.3% over April, 1940, figures.

Gross imports for April, as reported by the Department of Commerce, were 63,305 long tons, 27.3% under March and 10.5% below April, 1940.

The declared value per pound[1] for April imports averaged 17.60¢, against 17.89¢ in March and 18.00¢ in February. This decline contrasts with a sharp rise in New York average daily quotations from 22.12¢ in March to 22.78¢ in April; the closing price on April 30 was 23.75¢ for No. 1 ribbed smoked sheets.

[1] The "declared value per pound" is obtained by dividing the total value by the total pounds entered for the month. The legal requirements are that the price declared at the time of entry represent the foreign wholesale price at time of export from country of shipment, including containers and charges up to the time of shipment. The "declared value" represents an average for all types of contracts as well as all types of rubber.

Total domestic stocks on April 30, 1941, as estimated by the Association, were 329,767 long tons, 2.5% below the stocks on hand the end of March, but 116% over the stocks on hand April 30, 1940.

Stocks in the hands of the United States Government on April 30 were 177,856 long tons, 8.7% over March 31 stocks.

Crude rubber afloat to U. S. ports on April 30 is estimated at 153,484 long tons, 9.5% over March and 49.7% above April, 1940.

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks—Long Tons

Twelve Months	U.S. Imports*	U.S. Consumption¶	U.S. Stocks Mfrs., Dealers, Importers, Etc.†¶	U.S. Stocks Afloat	U.K.—Public Warehouses, London, Liverpool†‡	Singapore and Penang Dealers and Port Stocks†‡	World Net Exports‡	World Absorption‡*c*	World Stocks†‡§
1939	499,616	592,000	125,800	91,095	44,917*a*	15,299	988,600	1,110,383	447,666*a*
1940	818,624	648,509	288,864	145,950	.....	26,773	1,392,231	1,069,213	.....
1940									
Jan.	72,520	58,061	139,304*b*	90,285*b*	.....	35,928	129,557	**106,073**	.....
Feb.	43,088	52,078	129,023*b*	112,257*b*	.....	35,563	109,178	**96,755**	.....
Mar.	59,277	52,454	134,871*b*	113,615*b*	.....	23,830	99,954	**102,282**	.....
Apr.	70,700	52,361	152,645*b*	102,557*b*	.....	42,239	110,812	**100,570**	.....
May	51,571	54,513	148,881*b*	109,364*b*	.....	32,731	110,709	**94,988**	.....
June	53,889	47,834	154,313*b*	119,138*b*	.....	32,375	109,734	**78,642**	.....
July	69,596	48,354	175,455*b*	139,629*b*	.....	36,716	134,159	**75,607**	.....
Aug.	73,028	53,307	194,760*b*	141,286*b*	.....	40,395	118,498	**80,011**	.....
Sept.	78,972	52,469	220,597*b*	137,888*b*	.....	29,069	124,864	**77,978**	.....
Oct.	74,716	59,644	235,353*b*	166,837*b*	.....	33,613	124,918	**87,216**	.....
Nov.	72,901	57,716	250,412*b*	158,095*b*	.....	33,778	104,442	**84,352**	.....
Dec.	98,366	59,709	288,864*b*	145,950*b*	.....	26,773	115,411	**84,739**	.....
1941									
Jan.	86,833	65,989	309,411*b*	153,169*b*	.....	37,163	152,418	**96,925**	.....
Feb.	73,973	62,692	320,372*b*	136,955*b*	.....	46,913	101,667	**89,216**	.....
Mar.	87,123	69,024	338,147*b*	140,228*b*	.....	.....	.....	.....	.....
Apr.	63,305	71,374	329,767*b*	153,484*b*	.....	.....	.....	.....	.....

*Including liquid latex. †Stocks on hand the last of the month or year. ‡*Statistical Bulletin of the International Rubber Regulation Committee.* §Stocks at U. S. A., U. K., Singapore and Penang, Para, Manaos, regulated areas, and afloat. ¶Corrected to 100% from estimate of reported coverage. *a* Stocks as of Aug. 31, 1939. *b* Includes government emergency rubber. *c* Including producing countries.

Rubber and Canvas Footwear Statistics

	Thousands of Pairs		
	Inventory	Production	Shipments
1938	16,183	50,812	54,942
1939	16,388	60,612	60,377
1940	11,129	57,278	62,480
1941			
Jan.	10,377	5,939	6,614
Feb.	10,754	5,543	5,166
Mar.	11,222	5,827	5,359

The above figures have been adjusted to represent 100% of the industry based on reports received which represented 81% for 1936-37.
Source: *Survey of Current Business*, Bureau of Foreign & Domestic Commerce, Washington, D. C.

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.00 per line (ten words)	Light face type 40c per line (ten words)	Light face type 75c per line (ten words)
Bold face type $1.25 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.00 per line (eight words)

Allow nine words for keyed address. *Replies forwarded without charge*

SITUATIONS WANTED

PRACTICAL RUBBER CHEMIST, 12 YEARS' EXPERIENCE COMpounding and processing for tires, mechanical and proofed goods, involving natural rubber and all synthetics. Also experienced with latex, airfoam sponge, and dipped goods. Ph.D. Have held supervisory positions. Location immaterial. Address Box No. 253, care of INDIA RUBBER WORLD.

CHEMIST WITH FIVE YEARS' EXPERIENCE WITH RUBBER proofing of all kinds and adhesives desires position in sales or technical sales work. Address Box No. 254, care of INDIA RUBBER WORLD.

CHEMIST—PRODUCTION MAN—YOUNG, ABLE COMPOUNDER. Solid factory experience processing natural, synthetic rubber. Can handle men. Experienced footwear, rollers, molded mechanicals, calendered goods, sponge, latex. Available short notice. Address Box 255, INDIA RUBBER WORLD.

RUBBER CHEMIST, 6 YEARS IN THE INDUSTRY, CAN BE A compounder, factory process man, or an efficient production operator, thorough knowledge of all phases concerning auto casings, bike tires and tubes. Address Box No. 258, care of INDIA RUBBER WORLD.

RUBBER CHEMIST, THOROUGH TECHNICAL TRAINING. EXcellent theoretical background, now holds very responsible position, desires change. Address Box No. 259, care of INDIA RUBBER WORLD.

RUBBER CHEMIST, B.S., CH.E., 18 YRS.' EXPERIENCE COVERing factory management, compounding and development of tires, tubes, camelback, repair material, mechanicals, also some experience with synthetics. Desires position as factory manager or chief chemist with a smaller medium-sized manufacturer. Address Box No. 260, care of INDIA RUBBER WORLD.

EXECUTIVE-TYPE RUBBER ENGINEER DESIRES NEW CONnections. Capable as superintendent, development engineer, technical superintendent. 20 years' experience in all phases manufacturing of mechanical, sponge and synthetic rubber goods. Location no object. Address Box No. 269, care of INDIA RUBBER WORLD.

PRODUCTION MANAGER, SUPERINTENDENT, tires, tubes, mechanicals. Thorough knowledge all phases, compounding, processes, supervision, engineering. Good record of accomplishment. Address Box No. 271, care of INDIA RUBBER WORLD.

BUSINESS OPPORTUNITY

WELL-ESTABLISHED AND WELL-FINANCED ORGANIZATION interested in purchase of modern well-equipped Eastern plant for manufacture of rubber fabrics of all descriptions. Will deal with principals only; brokers and machinery dealers, save your postage. Cash deal. Address Box No. 264, care of INDIA RUBBER WORLD.

SITUATIONS OPEN

YOUNG RUBBER CHEMIST PREFERABLY EXPERIENCED IN reclaim, mechanical goods, heels and soles. State all qualifications, references, and salary desired. Address Box No. 256, care of INDIA RUBBER WORLD.

SUPERINTENDENT WANTED WITH EXPERIENCE IN THE manufacture of Quarter Linings. Only those with complete experience need apply. State salary and experience. Replies will be held strictly confidential. Wonderful opportunity for advancement for the right party. Address Box No. 257, care of INDIA RUBBER WORLD.

SUPERINTENDENT FOR RUBBER PLANT EMploying 200. Thorough knowledge of all phases such as compounding, curing, mechanical goods and hose manufacturing. Enclose recent photograph with work record and personal data. Reply to Box No. 266, care of INDIA RUBBER WORLD.

HELP WANTED: MAINTENANCE FOREMAN AND MILLWRIGHT, experienced mechanical rubber machinery. Address Box No. 267, care of INDIA RUBBER WORLD.

MECHANIC, VERSATILE, EXPERIENCED IN EXtruded Rubber industry with ability to adapt his experience to Extruded Plastic field. Factory located in New York City with efficient mechanical and tool-making facilities. State age, experience in detail, and salary requirements. Address Box No. 268, care of INDIA RUBBER WORLD.

RUBBER CHEMIST—MUST BE THOROUGHLY EXPERIENCED in compounding and general manufacturing of mechanical rubber sponge and synthetic rubber. State fully experience and salary desired. Address Box No. 270, care of INDIA RUBBER WORLD.

(*Advertisements continued on page 90*)

Classified Advertisements

Continued

MACHINERY AND SUPPLIES FOR SALE

FOR SALE: 2—84″ Heavy Duty Mills, also 1—60″, 1—50″, 1—36″, 12—30″x40″, 2—38″x78″ Hydraulic Presses; 1—Watson-Stillman Hydro-Pneumatic Accumulator; also Mills, Calenders, Tubers, etc. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York, N. Y.

THROPP MILL AND CALENDER FOR SALE: Almost new. Both motor driven. Size Mill 16″ x 42″; Three-Roll Combination Calender, 14″ x 36″. May be seen by appointment. UNIVERSAL PLASTICS CORP., New Brunswick, N. J.

FOR SALE: 1—TWO-ROLL WATER-COOLED RUBBER MILL, 6″ & 8″ dia. x 9″ face; 75-foot Link-Belt Conveyer, 36″ wide; Hydraulic Presses, Pumps and Accumulators, Rubber Mills, Mixers, Grinders, Pulverizers, etc. Send for latest bulletins. We buy your surplus equipment. STEIN EQUIPMENT CORP., 426 BROOME ST., NEW YORK CITY.

2 THROPP WASHER CUTTERS, IN GOOD CONDITION FOR sale. Also 1 pot vulcanizer. MARTIN RUBBER CO., Long Branch, N. J.

MACHINERY AND SUPPLIES WANTED

WANTED FOR USER: 1—NO. 3 OR NO. 9 BANBURY MIXER; 3—Mills; 1—Calender; 5—Hydraulic Presses, with pumps and accumulators; 2—Tubers. No dealers. Address Box No. 261, care of INDIA RUBBER WORLD.

WANTED TO BUY: BANBURY MIXER TYPE 3A. ADDRESS Box No. 262, care of INDIA RUBBER WORLD.

WANTED: 1—45-INCH MIXING MILL. MUST BE IN "READY to run" condition. State make, price, etc. Address Box No. 265, care of INDIA RUBBER WORLD.

His Great-Grandfather Rode a High-Wheeler

THAT was back in the Gay Nineties, when rubber was something you made garden hose and solid tires out of. It was back in 1891 when Great-Grandfather Albert started the enterprise that has grown through the years into a world-wide industrial service supplying new and rebuilt machines to the great names in rubber and plastic and chemicals.

Now, 50 years after, on the Golden Anniversary of the founding of our company, we cherish the fourth generation of Alberts . . . and we cherish too the ideals of service and integrity that have enabled us to maintain through half a century our commanding position as an efficient, world-wide purveyor of Rubber and Plastic processing machinery.

To us, our four warehouses in Trenton, Akron, Los Angeles and Boston . . . our processing shops . . . the skilled men who have for years made Albert machinery the best buy for economical, safe and efficient service . . . are a part of our family tradition.

L. ALBERT & SON

MAIN OFFICE AND PLANT TRENTON, N. J.

BRANCH OFFICES AND PLANTS: AKRON, OHIO • LOS ANGELES, CALIF. • BOSTON, MASS.

RUBBER & PLASTIC MACHINERY 50 YEARS 1891 1941 Albert

Dominion of Canada Statistics

Imports of Crude and Manufactured Rubber

	March, 1941		Three-Months Ended March, 1941	
UNMANUFACTURED	Quantity	Value	Quantity	Value
Crude rubber, etc.....lb.	8,364,232	$1,773,710	29,959,947	$6,184,150
Latex (dry weight).....lb.	324,732	95,918	1,263,963	378,068
Gutta percha .....lb.	3,350	4,276	8,307	5,420
Rubber, recovered.....lb.	1,319,900	76,297	3,878,900	220,299
Rubber, powdered, and gutta percha scrap .....lb.	430,200	8,989	1,262,200	27,662
Balata .....lb.	6,549	1,868	11,010	2,707
Rubber substitute .....lb.	21,400	7,697	101,200	25,897
Totals	10,443,363	$1,968,755	36,485,527	$6,844,203
PARTLY MANUFACTURED				
Hard rubber comb blanks...	.....	$6,821	.....	$16,551
Hard rubber, n. o. s.....lb.	6,111	3,175	11,543	8,319
Rubber thread not covered.lb.	3,094	2,872	9,299	7,761
Totals	9,205	$12,868	20,842	$32,631
MANUFACTURED				
Bathing shoes .....prs.	2,514	$858	15,176	$3,193
Belting	.....	13,164	.....	42,428
Hose	.....	23,524	.....	98,660
Packing	.....	8,607	.....	21,908
Boots and shoes.....prs.	662	710	1,677	1,179
Canvas shoes with rubber soles .....prs.	18	88	6,730	2,393
Clothing, including waterproofed	.....	4,816	.....	11,676
Raincoats .....no.	5,736	22,014	10,119	30,912
Gloves .....doz. prs.	.....	.....	607	1,728
Hot water bottles.....	.....	264	.....	511
Liquid rubber compound....	.....	6,601	.....	13,728
Tires, bicycle .....no.	3,160	2,518	6,346	4,979
Pneumatic .....no.	2,610	61,493	9,683	237,897
Solid for automobiles and motor trucks .....no.	24	873	97	3,620
Other solid tires.....	.....	853	.....	3,968
Inner tubes .....no.	1,846	6,596	7,938	26,408
Bicycle .....no.	2,707	784	7,015	2,016
Mats and matting.....	.....	16,693	.....	38,286
Cement	.....	12,266	.....	32,792
Golf balls .....doz. prs.	1,101	2,119	2,227	4,595
Heels .....prs.	18,464	1,666	30,358	2,447
Other rubber manufactures..	.....	238,565	.....	656,705
Totals	.....	$425,072	.....	$1,242,029
Totals, rubber imports..	.....	$2,406,695	.....	$8,118,863

Exports of Domestic and Foreign Rubber Goods

	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
UNMANUFACTURED				
Waste rubber	$13,443	.....	$43,566	.....
MANUFACTURED				
Belting	$43,419	.....	$100,345	.....
Bathing caps	66	.....	216	.....
Canvas shoes with rubber soles	22,179	.....	69,186	.....
Boots and shoes	152,480	.....	398,427	.....
Clothing, including waterproofed	17,401	.....	52,306	.....
Heels	1,573	.....	2,963	.....
Hose	45,928	.....	551,103	.....
Soles	602	.....	2,443	.....
Soling slabs	241	.....	2,521	.....
Tires, pneumatic	369,149	.....	1,019,522	.....
Not otherwise provided for	222,329	.....	297,623	.....
Inner tubes	39,749	.....	119,897	.....
Other rubber manufactures..	29,664	.....	88,994	.....
Totals	$944,780	.....	$2,705,546	.....
Totals, rubber exports...	$958,223	.....	$2,749,112	.....

Imports by Customs Districts

	March, 1941		March, 1940	
	*Crude Rubber Pounds	Value	*Crude Rubber Pounds	Value
Massachusetts	24,719,052	$4,419,957	11,474,163	$2,113,192
Buffalo	.....	.....	67,200	12,894
New York	132,588,427	23,982,444	84,521,675	14,952,651
Philadelphia	595,667	104,141	1,981,191	345,146
Maryland	11,533,223	1,986,767	6,414,515	1,097,871
Virginia	.....	.....	78,133	14,509
Mobile	4,555,876	777,828	668,288	106,865
New Orleans	4,636,363	810,361	8,812,081	1,492,401
Laredo	430,200	44,748	.....	.....
El Paso	.....	.....	99,000	9,722
Los Angeles	14,593,684	2,513,121	16,406,688	2,869,711
San Francisco	678,394	122,722	740,674	135,625
Oregon	.....	.....	13,440	2,890
Ohio	6,720	1,207	899,904	158,839
Colorado	817,600	139,961	560,000	87,211
Totals	195,155,206	$34,903,258	132,736,952	$23,399,527

*Crude rubber including latex dry rubber content.

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	—February, 1941— Quantity	Value	Two Months Ended —February, 1941— Quantity	Value
UNMANUFACTURED—*Free*				
Liquid latex (solids)....*lb.*	6,598,930	$1,279,648	11,491,790	$2,299,389
Jelutong or pontianak....*lb.*	1,709,139	245,732	3,272,527	467,643
Balata ....*lb.*	91,265	22,790	218,432	55,700
Gutta percha ....*lb.*	795,248	142,395	1,018,849	184,725
Guayule ....*lb.*	633,000	65,942	1,635,500	170,070
Scrap and reclaimed ....*lb.*	447,786	8,650	1,218,132	30,934
Crepe soled rubber....*lb.*	50,689	11,210	97,167	21,654
Totals	10,326,057	$1,776,367	18,952,397	$3,230,115
Misc. rubber (above), 1,000 *lbs.*	10,326	$1,776,367	18,952	$3,230,115
Crude rubber ....1,000 *lbs.*	158,468	28,469,753	347,079	61,840,235
Totals ....1,000 *lbs.*	168,794	$30,246,120	366,031	$65,070,350
Chicle, crude ....*lb.*	2,050,959	$772,855	5,053,824	$1,882,400
MANUFACTURED—*Dutiable*				
Rubber tires ....*no.*	217	$3,371	1,764	$38,738
Rubber boots, shoes and overshoes ....*prs.*	617	675	6,889	2,215
Rubber soled footwear with fabric uppers ....*prs.*	120,001	24,295	251,921	45,009
Golf balls ....*no.*	17,136	1,960	40,032	3,914
Lawn tennis balls....*no.*	23,640	3,040	33,240	3,891
Other rubber balls....*no.*	181,217	6,111	956,321	15,450
Other rubber toys....	.....	2,197	.....	3,210
Hard rubber combs....*no.*	.....	.....	.....	.....
Other manufactures of hard rubber	.....	.....	.....	.....
Friction or insulating tape..*lb.*	2,185	1,974	5,144	2,524
Belts, hose, packing, and insulating material....	.....	7,852	.....	9,006
Druggists' sundries of soft rubber	.....	420	.....	966
Inflatable swimming belts, floats, etc. ....*no.*	34,700	2,971	78,494	7,650
Other rubber and gutta percha manufactures	.....	12,288	.....	25,480
Totals	.....	$67,154	.....	$158,053

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber ....*lb.*	731,922	$144,139	1,385,683	$282,148
Balata ....*lb.*	17,345	8,405	43,643	19,105
Other rubber, rubber substitutes and scrap ....*lb.*	8,881	2,641	13,166	3,734
Rubber manufactures (including toys)	.....	19,434	.....	36,017
Totals	.....	$174,619	.....	$341,004

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed ....*lb.*	2,260,581	$114,332	3,553,632	$186,932
Scrap ....*lb.*	9,068,163	134,325	17,276,097	252,216
Cements ....*gal.*	21,748	23,657	59,224	62,345
Rubberized auto cloth.*sq. yd.*	13,223	5,554	45,740	24,633
Other rubberized piece goods and hospital sheetings.*sq. yd.*	301,812	137,558	548,152	272,437
Boots ....*prs.*	10,894	24,262	22,306	54,303
Shoes ....*prs.*	24,232	14,392	38,743	22,230
Canvas shoes with rubber soles ....*prs.*	66,158	46,267	103,560	79,567
Soles ....*doz. prs.*	2,504	7,772	5,600	12,906
Heels ....*doz. prs.*	32,097	16,330	53,335	28,039
Soling and top lift sheets..*lb.*	25,789	6,818	37,936	10,607
Gloves and mittens..*doz. prs.*	6,747	13,105	17,392	37,378
Water bottles and fountain syringes ....*no.*	36,109	11,625	77,144	24,210
Other druggists' sundries....	.....	75,548	.....	147,549
Gum rubber clothing....*doz.*	15,067	32,432	26,757	59,761
Balloons ....*gross*	17,432	11,122	35,508	25,837
Toys and balls	.....	6,547	.....	13,094
Bathing caps ....*doz.*	6,423	12,149	8,391	16,141
Bands ....*lb.*	8,587	4,370	18,857	8,941
Erasers ....*lb.*	22,671	13,311	48,369	28,392
Hard rubber goods				
Electrical battery boxes.*no.*	26,780	18,319	70,531	52,914
Other electrical ....*lb.*	57,246	14,615	121,677	31,094
Combs, finished ....*doz.*	29,821	15,037	44,301	24,115
Other hard rubber goods....	.....	26,739	.....	47,740
Tires				
Truck and bus casings..*no.*	73,327	1,703,477	131,761	2,969,633
Other auto casings.....*no.*	65,224	851,425	111,850	1,409,679
Tubes, auto ....*no.*	91,748	196,336	170,213	388,784
Other casings and tubes..*no.*	23,650	202,496	39,753	268,154
Solid tires for automobiles and motor trucks....*no.*	516	10,293	943	16,785
Other solid tires....*lb.*	5,060	1,373	19,285	4,636
Tire sundries and repair materials ....*lb.*	308,870	85,124	510,645	142,268
Rubber and friction tape..*lb.*	50,097	15,262	109,725	32,968
Fan belts for automobiles.*lb.*	24,914	12,668	59,753	29,595
Other rubber and balata belts ....*lb.*	239,705	137,824	591,610	313,561
Garden hose ....*lb.*	41,030	9,173	72,428	15,419
Other hose and tubing....*lb.*	387,201	178,905	1,027,398	453,772
Packing ....*lb.*	119,580	50,905	239,302	108,791
Mats, matting, flooring, and tiling ....*lb.*	106,142	13,247	233,520	31,188
Thread ....*lb.*	30,494	26,584	79,632	65,581
Gutta percha manufactures.*lb.*	50,085	18,350	94,664	33,068
Latex (d.r.c.) and rubber sheets processed for further manufacture ....*lb.*	180,925	33,080	219,932	43,806
Synthetic rubber (bulk)...*lb.*	75,955	44,374	191,677	97,503
Other rubber manufactures..	.....	158,922	.....	316,439
Totals	.....	$4,536,004	.....	$8,265,011